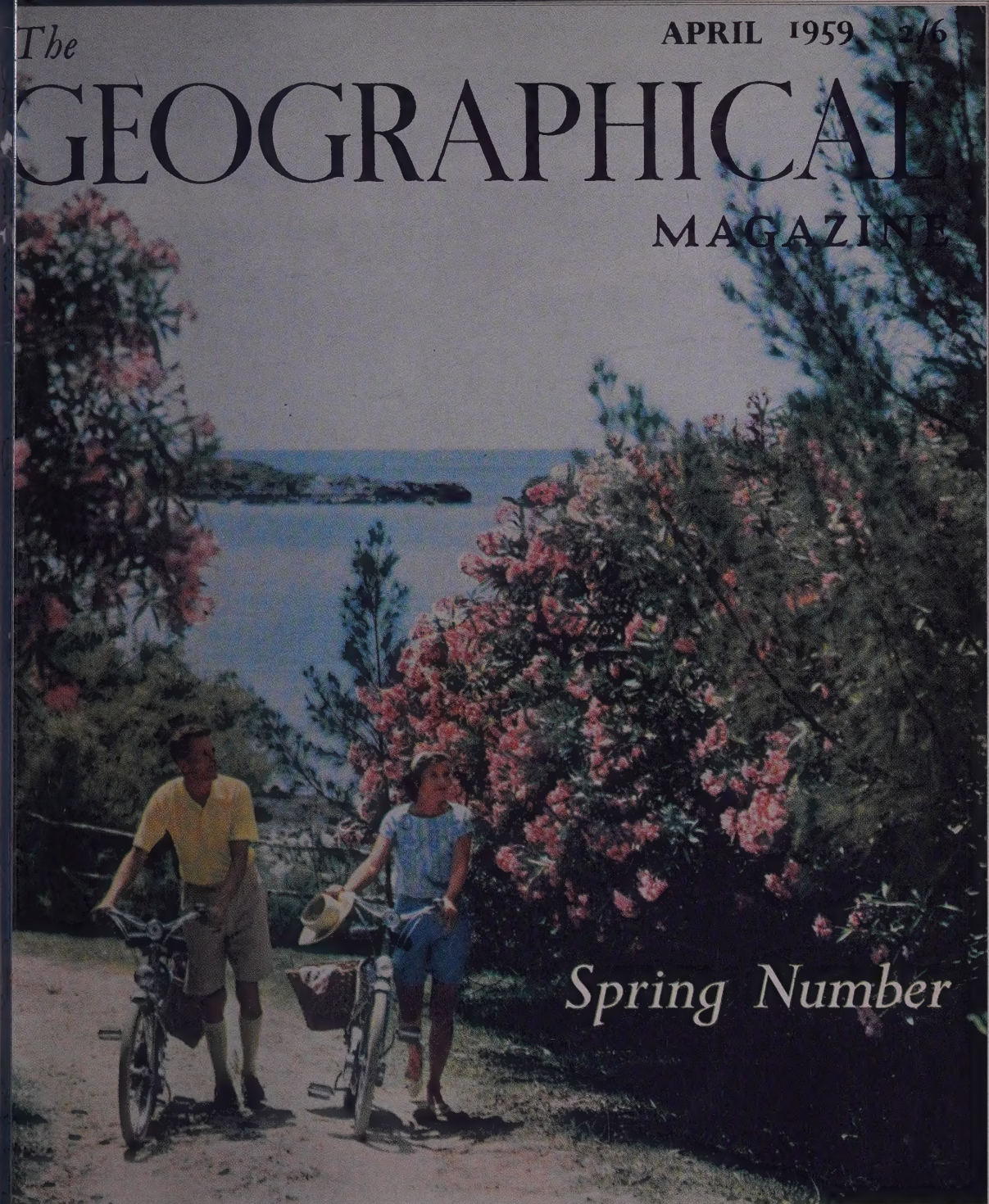


The

APRIL 1959 2/6

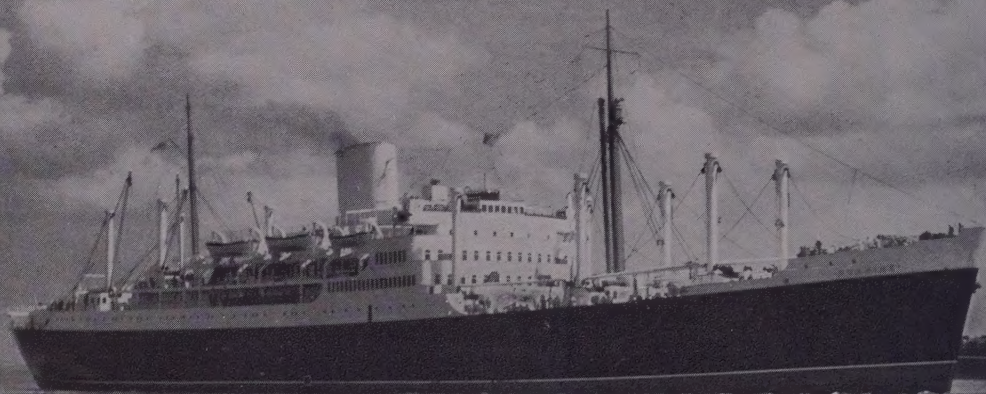
GEOGRAPHICAL MAGAZINE



Spring Number

Islands on the Duke's Route
HONG KONG • THE GILBERTS • BERMUDA

NEW ZEALAND LINE



REGULAR PASSENGER SERVICES VIA PANAMA

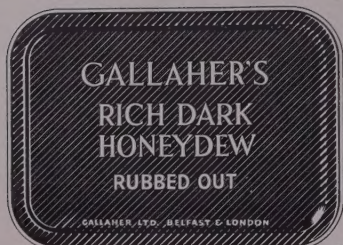


It's time you savoured the
deep contentment of
GALLAHER'S
RICH DARK
HONEYDEW

a blend of fine tobaccos...sweet smoking...long lasting...
so happily contrived that it will grow in your affection.

4/11 PER OZ · 9/9 PER 2 OZ
ROUND TINS

FLAKE OR RUBBED OUT



Housing Hong Kong's 600,000 Homeless

by SIR ALEXANDER GRANTHAM, G.C.M.G.

This number contains articles on three islands or groups which H.R.H. the Duke of Edinburgh is visiting in the course of his present tour: Hong Kong, the Gilbert Islands and Bermuda. He is accompanied by Sir Alexander Grantham, who was Governor of Hong Kong from 1947 to 1957, during which time the formidable problem described herein came to a head and was successfully tackled. World Refugee Year, beginning next June, will give us all an opportunity of helping to solve it

EARLY in the morning on Boxing Day 1953 I was returning in the dinghy to the Governor's yacht *Lady Maurine* after a walk on the hills of one of the outlying islands of Hong Kong, when I saw coming towards us the dory of the police launch that always accompanied us—we called this police launch our guardian angel. "This", I said to myself, "means bad news"; and it certainly did, for it was a radio-message from the Colonial Secretary in Hong Kong telling me that on the previous night there had been a disastrous fire at the Shek Kip Mei squatter area, depriving 60,000 people of shelter. He added that all necessary measures were being taken. I sent back a reply telling him that I was returning immediately and asking him to summon a meeting at Government House of the Executive Council and others concerned. When I got back to Hong Kong I learned the details of the measures—emergency measures of course at this stage—that had been taken.

I then proceeded to the scene of the disaster; and what a heart-rending sight it was. An area of some forty-five acres was just a charred mass of smoking ruins—if one can call burnt-out flimsy shacks ruins. It had all happened in the space of three hours: a population equal to that of a city the size of Chester bereft of shelter and everything they had destroyed. There were still a few of the victims hopelessly searching for whatever remained of their pathetic belongings.

By contrast, however, the relief measures that were being taken were a cheering sight. Cooked food was being served out to long lines of the destitute and amongst those serving the food were members of the Armed Services: Navy, Army and Air Force. About half those burnt out had managed to find accommodation of some kind or other with relatives or friends. Of the remainder some were housed in whatever temporary accommodation could be found, whilst the balance

were huddled on the pavements of side-streets making do as best they could. Here temporary latrine and washing facilities of a very simple kind had been set up by the Urban Services Department. I must also pay tribute to the magnificent work that was done by the Police, the Civil Aid Services (equivalent to our Civil Defence Services) and the voluntary agencies: St John Ambulance Brigade, Salvation Army, Catholic Welfare, Red Cross and a host of others; but above all by the local "Kaifong" or District Associations.

The head of the Sham Shui Po Kaifong, which was the one principally affected, was Mr Parkin Wong, a most stout-hearted citizen. I had met Mr Wong on a number of previous occasions. He had the appearance of an old-fashioned Chinese with the long gown that few of his class now wear. When we first met I had asked the interpreter who was with us if Mr Wong spoke any English; to which Mr Wong himself replied in perfect English: "I can manage a few sentences." He was a graduate of Columbia University! I am glad to say that for his outstanding work in connection with Shek Kip Mei he was awarded the Certificate of Honour. A few years later he got the O.B.E., for he was always foremost in welfare works.

It was very fortunate that only two lives were lost in this disaster and both of them were from heart-failure. That the loss of life was negligible was due to the valiant efforts of the Fire Brigade and the fact that all the structures were single-storey.

It may be asked who were these squatters, how did they get there, and why was such a situation allowed to arise? At the end of the Pacific War and on the reoccupation of Hong Kong by the British in August 1945 there were some 25,000 squatters, that is, persons who had nowhere to live and who squatted in bombed-out sites in various parts of the cities of Victoria on the Island of Hong Kong



Douglas Pike



Hong Kong has long been overcrowded. Even before World War II a flood of refugees from the mainland, driven by civil war and Japanese invasion, had brought its population to over 1,500,000. Out of a total land area of 391 square miles, only 62 are fit for urban development or even agriculture, the rest being mountainous or marshy. Onto this minute space by 1950 nearly 2,400,000 people were crammed, some 750,000 to 1,000,000 of them being refugees from Communist China. With no farm-land available they congregated, seeking work, near the cities of Victoria and Kowloon. (Above) Victoria, from the Peak: a fringe of crowded buildings backed by steep green hills whose sides are dotted with white apartment-houses. (Left) Des Voeux Road, the main artery of Victoria, is in the heart of the business centre of Hong Kong

and Kowloon on the mainland. Our task at that time was to move them away from the centre of the cities to the outskirts, until in a few years the war-devastation had been made good. This seemed like a simple problem which would in due course solve itself. Little did we then realize that we should soon be flooded out with refugees from China and that the number of these, including our own local squatters, would amount to some 600,000. These 600,000 huddled together in their hundreds and thousands wherever there was any available land, as near likely places of work as possible, and preferably on flat land. But there was little available land in the urban areas and hardly any flat land. Most of them therefore clustered on steep hill-sides on the fringes of the city, though 60,000 or so of them settled on the roof-tops of tenement buildings, which created a particularly serious fire-hazard. The squatter areas, wherever they were, were a health- and fire-menace of the first magnitude to the whole colony. They were built of the most inflammable and flimsy material, flattened-out kerosene-tins, bits of match-board-ing, old sacks, anything; and there were no sanitary facilities whatever. They were also the

harbouring-places for criminals and vice-peddlers of all kinds.

I should mention here that not all the refugees became squatters. Some of them went to live with relatives or fellow-clansmen. Others bought or rented accommodation from local residents who then went and lived as squatters. Thus while refugees from China might number anywhere from 750,000 to 1,000,000, the people living in squatter colonies reached a maximum of 600,000.

Now why did the Hong Kong authorities allow the position to get out of hand to such an extent? The reasons for this are many. Hong Kong had always had a tradition of free entry for Chinese from the mainland of China. Moreover in pre-Communist days, that is before the Communists came into power in China, it had not infrequently happened that when there was a local war in the provinces of China near Hong Kong refugees would come pouring in in their thousands, but as soon as the disturbance was over they would go back. There was therefore no need for the local government to house or feed them. In fact, to have done so would only have resulted in thousands more coming in.





Camera Press



(Left) The already overcrowded tenements of Kowloon and Victoria could absorb few of the refugees; some thousands of them settled (above) in colonies on the roof-tops, where they 'squatted' in flimsy shelters. But the great majority of the 600,000 such squatters whom Hong Kong's population included in the early 1950s lived in crude shacks packed in dense clusters on the neighbouring hillsides. (Opposite) These squalid warrens harboured vice and crime, threatened public health and carried grave danger of fire. In 1951 the first steps were taken in a long-term programme aimed at resettling the squatters gradually in better conditions in other areas



By courtesy of the Inter-Church Aid & Refugee Service

Shortly before the Communists came to our border at the end of 1949 we in Hong Kong had had an argument with London. London wanted us to erect a barbed-wire fence along the frontier and to prevent, by force of arms if necessary, refugees, especially the routed armies of Chiang Kai Shek, from entering the colony. This we in Hong Kong had objected to, for we said it would inevitably lead to bloodshed and then a serious international situation would arise. Furthermore, we added, we considered that as soon as things had settled down in China the refugees would go back. London accepted our view on the first point and the refugees came streaming in. On the second point—that the refugees would return to China—we were wrong. They did not go back, and we certainly couldn't be so inhuman as to force them back, even if that were practicable, which it wasn't.

That is why Hong Kong has these hundreds of thousands of refugees, most of them squatters, on its hands. It was some time before we abandoned the hope that things would so settle themselves in China that the refugees would return to their own homes there. Certain palliative measures had been taken, such as driving fire-lanes through the larger squatter areas, and we were thinking of

doing something far more drastic when the Shek Kip Mei fire compelled us to make up our minds and take speedy action.

The first thing to be done was to house the victims of the fire as soon as possible. It takes less time to build a single-storey structure than, say, a four-storey one. On the other hand single-storey building is wasteful in land and land is sadly lacking in Hong Kong. Yet again to build more than two storeys in height would take too long. So we compromised and decided to erect rows of two-storey buildings that looked rather like barracks. These were called "Bowring Bungalows" after Mr Bowring, the versatile and imaginative Director of Public Works who conceived the idea and produced the plans. It was not merely a question of erecting the bungalows: the site had first to be bulldozed level—here the Army was as helpful as they always are—and a proper drainage system put in before building could even be started. Nevertheless, within seven-and-a-half weeks the first of the bungalows was ready for occupation, and the rest very shortly afterwards.

But the Bowring Bungalows were not a fundamental solution. Their standard of accommodation was too low, they took up



by courtesy of the Inter-Church Aid & Refugee Service

Fire! On Christmas Day 1953 the Shek Kip Mei squatter area on the outskirts of Kowloon caught light and burnt like matchwood. In three hours 60,000 people were deprived of shelter and lost—

too much space in land-short Hong Kong and they only took care of the Shek Kip Mei victims, a mere one-tenth of all the squalidly housed squatters. The next stage, therefore, and this was dealing with the squatter problem as a whole and not merely the Shek Kip Mei victims, was to erect multi-storey blocks of tenement buildings. Each of these blocks could house some 2600 persons. The accommodation was certainly austere and sub-standard. In a room of 120 square feet five adults were housed, but this was infinitely better than what they had been living in before. It was clean and it was fire-proof; also the rent they had to pay, 17s. 6d. a month, cost them a good deal less than what they were paying for their even more cramped and dingy shacks. The decision to erect the multi-storey blocks denoted a fundamental change in Government policy, for the Government had now committed itself, deliberately, to housing some 600,000 persons. (In addition, there were some 300,000 people living in slum conditions. This analogous

problem had also to be tackled, but could not be dealt with all at once, nor so speedily as the standard had to be better.) In the multi-storey blocks, which consist of seven floors and on top have a flat roof which can be used for recreational purposes, space was also provided for factories, although I suppose they should really be termed simple workshops, comprising maybe 240 square feet. Communal facilities were not forgotten, such as young people's clubs, schools, etc. Here the private welfare organizations stepped into the breach with the cooperation of the Government's Social Welfare Department.

This conglomeration of people created other problems besides that of housing, such as health and education. The latter was made more difficult by the fact that not only had the population of Hong Kong increased four-fold since the British reoccupation—to over 2,400,000 from the 600,000 to which it had by then been reduced—but many, if not most, of the school buildings had been destroyed or damaged during the hostilities. A

great deal has been done to improve the situation, but even today there are some 80,000 children of school age getting no education at all and some 40,000 more getting inadequate education. "Rome was not built in a day", and this is certainly true of Hong Kong's educational policy, but steady progress is being made with the building of more and more schools and the training of more and more teachers. It is no good having a lot of new schools with no teachers to put into them. Employment for the refugees was another serious matter, for at the height of the flood of refugees came the embargos on trade with Communist China imposed in 1950 by the United Nations and the United States and from these Hong Kong suffered more than any place in the world, for the reason that Hong Kong is an entrepôt, and her natural trading partner is China. Somehow or other the population managed; but then the Chinese are a very remarkable people.

The refugees had for the most part come over the land frontier between China and Hong Kong. This frontier is twenty-two miles

long. For part of it there is a river dividing the two territories with a couple of bridges across it; the main one, rail and pedestrian, the other, road and pedestrian. Elsewhere the boundary is not clearly defined to the casual eye, and farmers may own one bit of land on the Chinese side of the border and another piece on the British side. At the frontier village of Sha Tau Kok at the eastern extremity, the boundary runs right down the middle of the village street. It was not unusual at this village for expectant mothers living in the Chinese part to come over to the maternity clinic on the British side to have their babies and then return to their Chinese homes. Being born on British territory the babies were entered on the Hong Kong register of births and deaths as British subjects. Whether they were registered in China as Chinese subjects I don't know, but in any case the Chinese law, even in pre-Communist days, was based on blood, i.e. the nationality of the parents, and not on place of birth as with us.

The flood of refugees showed no signs of stopping, so in 1950 it was decided to close

—all their pathetic possessions; forty-five acres were devastated. It was the most extensive and destructive fire in the history of Hong Kong. Overnight a serious problem had become critical





Camera Press

After the Shek Kip Mei fire about half the victims were able to take refuge with friends ; many had to be fed. Each day they queued for food at a government emergency relief centre



Crown copyright, by courtesy of the Hong Kong Government

(Above) Volunteers distributing food. The Social Welfare Department of the Hong Kong Government was joined in aiding the Shek Kip Mei victims by over a hundred voluntary organizations; the Armed Services also helped in various ways. (Below) Red Cross workers handing out blankets after the fire

By courtesy of the British Red Cross Society





Three photographs Crown copyright, by courtesy of the Hong Kong Government

(Above) *Within fifty-three days after the fire at Shek Kip Mei the first units of emergency accommodation, the "Bowring Bungalows", were completed on the site pending a comprehensive resettlement scheme.*

(Below) *The same view in June 1958, when twenty-six permanent seven-storey blocks had been completed*



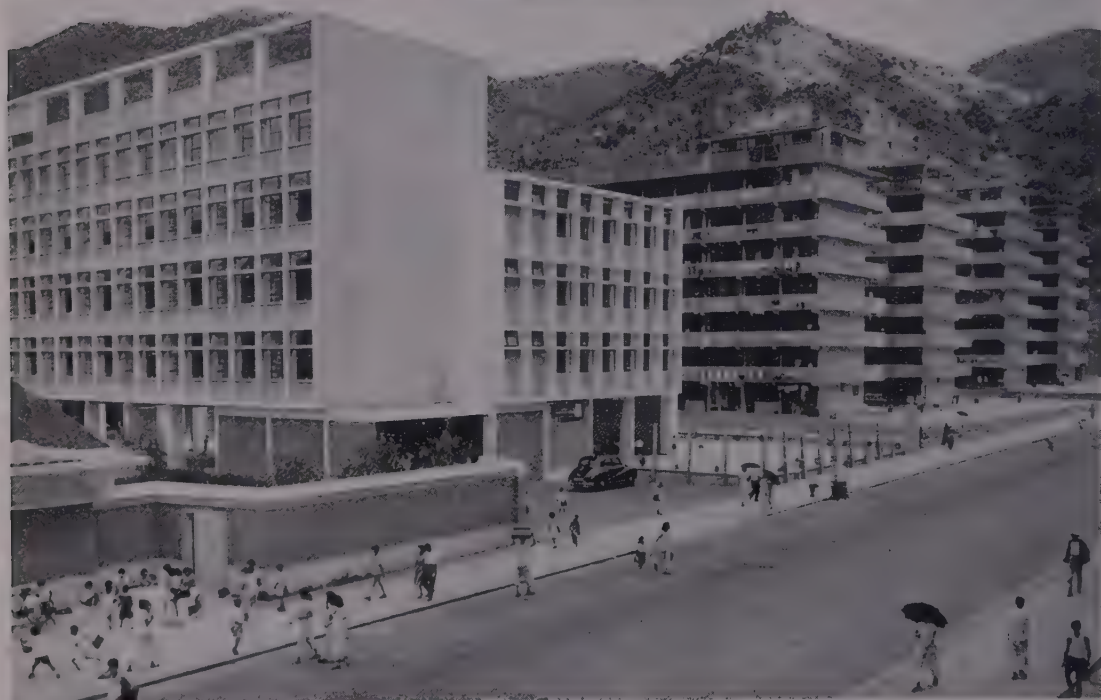
Multi-storey housing at Tai Hang Tung, where another former squatter colony was burnt out only seven months after Shek Kip Mei and has now been rebuilt on similar lines. The Hong Kong Government has committed itself to rehousing all its 600,000 homeless. Already it has reached the half-way mark





Both photographs Crown copyright, by courtesy of the Hong Kong Government

Hong Kong's refugees present other urgent problems, among them being education. Voluntary organizations operate temporary schools, such as (above) this one on a roof-top, as an interim measure until the government schools are ready. (Below) A new school in a resettlement estate in Kowloon



the frontier and a good deal of it was wired, but not all of it. Needless to say there were minor incidents on the frontier from time to time. I used to go along the border occasionally just to see things for myself and whenever I went up to the barrier at the bridge at Lo Wu the Chinese Commanding Officer on the other side of the barrier would take my photograph. This was standard practice which was meted out to all visitors to the frontier. Whether or not there were any films in his camera we were never able to discover. He always looked rather shame-faced about it. But there were more serious incidents. At one time, at a part of the frontier where the boundary was ill-defined and where there was no wire, every day during daylight hours a small contingent of Chinese Communist soldiers would come over onto Hong Kong territory. On one occasion they would not allow a patrol of British troops and police to proceed. On another occasion they pointed their Tommy-guns at the British Army Commander-in-Chief who was on a visit from his headquarters in Singapore. This was too much for the Commander British Forces in

Hong Kong. He wished to eject the intruders. This certainly would have meant a skirmish, for it would have been more than their lives were worth for the Chinese corporal (or whatever he was) and his men to have withdrawn at the behest of the British. And there was no telling what a trivial frontier skirmish might lead to. So the C.B.F. and I agreed that we would first try gentler and, as we thought, subtler tactics. Accordingly the Hong Kong Police Officer in charge at the frontier sent a note by the hand of an intermediary to his opposite number on the Chinese side, pointing out that the Chinese soldiers were trespassing on British territory, that they probably didn't know that they were, and requesting that they should be instructed to cease to do so. The letter was returned, opened, but unanswered. Nonetheless the next day there were no Chinese soldiers on our part of the border and during the intervening few hours we erected a bit more wire. The actual manual work was done by ordinary Public Works Department coolies. The foreman, a Chinese, was threatened by a Communist soldier. He, the

Providing work for the refugees, who were nearly all farmers, is an equally important task. To this end a new Technical College has been built by the Hong Kong Government with financial help from local firms. It will cope with the demands of the Colony's rapidly expanding industries

Crown copyright, by courtesy of the Hong Kong Government





Camera Press

The bridge at Lo Wu is one of two connecting Communist China with Hong Kong. Naturally there are 'incidents' from time to time and great tact is needed to prevent them from becoming serious

foreman, merely spat on the ground and told his men to get on with their work, which they did. He was awarded the B.E.M.

On another occasion at Lo Wu bridge the British Police Officer in charge was horrified to see one of his men being marched away by Chinese Communist soldiers on the other side. How he got there was a mystery, but we had to get him back. We did not want to launch a military expedition. Again we had to play it the Chinese way and Mr MacIntosh, the Commissioner of Police, by devious means best known to himself, got the agreement of the Chinese on the other side to return him. One of the things they asked for as a *quid pro quo* was that a searchlight from one of our police posts should alter its beam slightly as it was shining into one of their barrack-rooms and keeping them awake at night! To alter the beam of a searchlight was a small price to pay for the getting back of our man. These are but two of the frontier incidents. Certainly

there is never a dull moment in Hong Kong and one has to be on one's toes all the time.

This article, however, is really about the squatters and housing problems in Hong Kong. Have the measures taken by the Hong Kong Government been successful or not, and are they appreciated by those who have benefited by them? The answer is clear: they are appreciated and this is shown by the fact that less than 0.1 per cent of the rents due have to be written off as irrecoverable. But the problem of rehousing the squatters has only got to the half-way mark, 300,000 out of 600,000. To have achieved this much—and 300,000 is equal to the population of Hull—is no mean accomplishment, and it has been done entirely out of Hong Kong's own resources. We must also not forget that the natural rate of population increase, thanks to the efficiency of the health and medical authorities, is remarkably high. All that we can say, therefore, is "so far so good".

Bermuda: the Summer Islands

by ANNE BOLT

The last island to be visited by H.R.H. the Duke of Edinburgh during his present tour is Bermuda, where this year the 350th anniversary is being celebrated of that accidental landing by Sir George Somers which began its colonization and led eventually to its acquisition by the British Crown

ABOUT the year 1511 (the date is disputed) Juan de Bermudez happened on a tiny archipelago—and in his honour it was called the Bermudas. On one of their many voyages to the New World, other Spaniards later loosed some hogs on the little islands, but they never returned to colonize.

It was nearly a hundred years before Bermuda came into the news again, and then it was by accident. In 1609 Admiral Sir George Somers sailed with nine vessels for Virginia. In a terrible storm some 700 miles from America, the small fleet became separated. The Admiral's flagship sighted land, and with great skill he brought the *Sea Venture* through a break in the reef and managed to beach his ship, just 350 years ago. Somers and his crew eked out the rations salvaged from the *Sea Venture* with the Spanish hogs, which had "multiplied exceedingly". For ten months they laboured to build two small ships from the cedars which covered the islands, and when they eventually reached Virginia, tales of their gallant adventure astounded the New World and the Old. The most lively account was given by an anonymous writer in Virginia:

There arose such a storm the heavens were obscured and made an Egyptian Night of three daies perpetual horror; the women lamented, the hearts of the passengers failed, the experience of the sea captains was amazed, and the skill of the mariners confounded. The ship most violently leaked, though two thousand tunne of water by pumping, from Tuesday noone to Friday noone, was discharged, notwithstanding the ship was halfe filled with water and those that laboured to keep others from drowning were half drowned themselves in labouring.

In *The Tempest* Shakespeare, ever topical, made Prospero send Ariel to the "still-vex'd Bermoothes"—and his spelling mirrored the correct pronunciation of the name of Juan de Bermudez. Edmund Waller wrote *The Battell of the Summer Islands* and on all old maps Bermuda was called "The Summer Islands", after the resourceful Admiral Somers. The Elizabethan love of puns lingered well into the 17th century and an

empiric attitude to spelling made such jokes easy.

Hardly had the news come back to England than a group of noblemen and merchants bargained with James I for a Charter. Some names of the interested noblemen are still perpetuated in Bermuda: Somerset, Pembroke, Devonshire, Paget, Warwick and Southampton (Shakespeare's patron). All these had shares in the "Company of the City of London for the Plantacion of the Somer Islands".

It was in Southampton Parish, Bermuda, in 1956, that I met a tall American. He asked me the way at the crossroads.

"If I go up there, where do I get to?"

"After half a mile, you get to the sea," I replied.

"And if I take the other road?"

"Well, you can walk three-quarters of a mile, then you come to the sea again."

"I know the sea is just behind me," he said, puzzled. "What kind of a place is this? I'm from Texas and I can ride for twenty miles in every direction without even coming to my own fence."

Bermuda is indeed a strange little isle or, to be more accurate, group of 150 islands. The six largest are joined together by bridges and causeways, but the total area is scarcely more than twenty square miles and at no point are you more than a mile-and-a-half from the sea.

Geologically, the Bermudas are fascinating. Six hundred miles from the nearest land, they are indeed the "remote Bermudas" described by Andrew Marvell. Aeons ago, submarine eruptions threw up peaks of volcanoes and piled rocks almost to the surface of the sea. Upon them coral insects produced several square miles of coral rock. During an early glacial period, concentrations of snow and ice lowered the sea-level of this latitude. The coral-covered volcanic humps were therefore exposed to the atmosphere and pulverized by the elements to sand and, in the course of time, earth was formed on the surface by decomposing coral and subsequent vegetation. During the following warm or inter-

glacial period, the sea rose again and more coral was formed below the sea-surface on the area already covered with coral and sand. This process continued with the lowering of the sea in each glacial era, and the formation of layers of earth appears to have taken place during four successive cycles. In recent excavations in Bermuda three layers of earth, plus the present rough surface, have been revealed; and bones, tree-trunk cavities and old palm-tree impressions have been found.

That coral polyps work so industriously in latitude 32°N is a phenomenon in itself. Waters warm enough for the coral insect normally extend only 30° north and south of the Equator. But the Gulf Stream, sweeping up the eastern seaboard of America, swings eastwards north of Bermuda and protects the Summer Islands from the cold northern waters.

The climate of the islands is never extreme. To say they enjoy perpetual spring is a poet's exaggeration, but in summer it is seldom hotter than 87° Fahrenheit, in winter the atmospheric temperature averages 60° , and the coral insects cannot live in seas colder

than 70° . Bermuda has no rainy season but but as it is set in mid-ocean the winds bring rain at necessary intervals. Necessary indeed, for the islands have neither rivers nor streams so all drinking-water is rain-water, supplemented by brackish wells for general use.

The climate allows Bermuda two crops a year and the next sixty English settlers who arrived in 1612 were soon growing maize and potatoes as well as figs, bananas and oranges introduced from the West Indies. Beef, pork and dried fish were exported to Virginia, but the "Bermuda Company", headed by the Earl of Warwick, were all keen capitalists: they wanted quick returns and tobacco was the answer. As early as 1618, 70,000 lbs were sent back to London, and tobacco became the first currency of the island—a pound of it was worth 2s. 6d.

By 1622 the population was about 1500 and ten prospective brides were sent from England, bachelors bought them for 150 lbs of tobacco apiece, and ten husbands expressed themselves well satisfied with their bargain. Alas, the tobacco boom did not last. By 1677 the Bermuda top-soil was exhausted,

Front Street, the main thoroughfare in Hamilton, winds pleasantly along the waterfront of Hamilton Harbour, lined with shops and offices built in a jumble of quite unrelated architectural styles. On the other side of the street liners come alongside to disgorge their freight and tourists

11 monochrome photographs, except one, by Anne Bolt





All Ektachromes by courtesy of The Bermuda News Bu

Hamilton, the capital of Bermuda, viewed across the harbour from Paget. On the skyline are the Cathedral and the Sessions House, site of the oldest parliament after Westminster in the Commonwealth. Bermuda's beautiful pink "Rose Laurels" have delighted for many years. In 1858 Anthony Trollope wrote: "Bermuda might almost be called the Oleander Island"



Easter lilies in Bermuda. The flowers are made into perfume locally and are also exported by air. Mark Twain declared: "Bermuda is the right country for a jaded man to loaf in. There are no harassments; the deep peace and quiet sink into his body and bones and give his conscience a rest"

Castle Harbour is one of Bermuda's large areas of sheltered water. The Irish poet Tom Moore in 1804 took up a sinecure as Registrar to the Vice-Admiralty Court in Bermuda. He was often a guest at Walsingham, country seat of Samuel Trott, President of the Assembly. The estate was situated on a neck of land jutting out into Castle Harbour, and Moore wrote :

*The morn was lovely, every wave was still,
When the first perfume of a cedar-hill
Sweetly awakened us, and with smiling charms
The fairy harbour woo'd us to its arms*





Bermuda has many charming small beaches, but also there is the long golden stretch of Coral Beach in Paget Parish, where the line of reefs can be seen about half a mile from the shore. In the 17th century Andrew Marvell wrote of the early settlers in the islands:

*What should we do but sing His praise
That led us through the watery maze,
Unto an isle so long unknown,
And yet far kinder than our own?*

*He lands us on a grassy stage,
Safe from the storms and prelate's rage
He gave us this eternal spring,
Which here enamels everything*

so attempts were made to diversify the economy. Slaves were imported to work the plantations, but the small area could barely support the population—which had grown by 1687 to 5889 souls, including 1737 Negro slaves—and there was nothing over for export. So the colonists turned to their natural element, the sea. For years they had been building sloops with their own cedar-wood: gradually they became carriers for the whole of the Americas. They also established a thriving trade in salt from the Turks Islands in the Bahamas and in doing so evolved the world-famous Bermuda rig. To fetch salt, Bermudian sea-captains had to beat down against the prevailing south and south-west winds, and so they ingeniously adapted the local leg-of-mutton rig. They heightened the mast and did away with the gaff so that they had a high sharp triangular sail with a long leading edge. With no gaff to sag away to leeward and spill the wind, the Bermuda rig was superbly fashioned for working to windward, and in the present century it has become universally popular for yachts.

Bermudian mariners increased their gains by a little judicious piracy and privateering. The islanders would be the first to admit that their ancestors did not worry overmuch about the delicate dividing-line between the two. During the 17th and 18th centuries privateers wrought havoc with the enemies of England, and Spanish doubloons and French silk piled high in the cellars beneath these sea-captains' houses. Pirates took their loot from enemies and friends alike, and they outsailed most of their prey with their splendidly practical Bermudian rig.

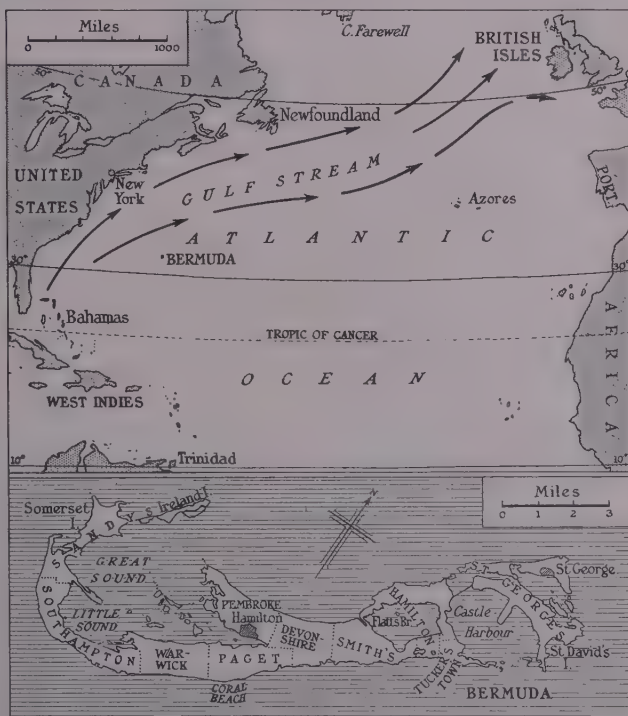
The Summer Islands were indeed fortunate for they were protected from reprisals by the coral reef that surrounds the tiny archipelago. Old stories relate that the islanders were not above a little wrecking. One Sunday a few men pushed into the back of a small village church and murmurs of "A wreck! a wreck!" could be heard above the singing. The parson held his hand up and said: "My children, let us finish the hymn in peace and dignity. Then let me take off my

cassock so that I can start fair in the race with the rest of you."

There are only two breaks in the reef that surrounds Bermuda; the smaller at the extreme western end was deliberately blocked with a wreck during World War I, so there remains but one entrance, the one found by the resourceful Sir George Somers 350 years ago, and nowadays through this narrow entrance great cruising-liners from Europe and America bring thousands of happy visitors to the island.

From the southern beach you can swim out to the reef which on this side of the island is only a quarter of a mile away. Through a fish-mask I watched thousands of brightly coloured fish, yellow tails with oxidized silver bodies, angel-fish trailing filaments of gold, enchanting sea-horses, and gaudy parrot-fish so tame they even came up to nibble my nail-varnish. The reef is seven miles away on the northern side of the island, but it still gives protection from the pounding of the Atlantic and bathers can always be safe from sharks.

Shark is one of the delicacies of the island. You pulverize the flesh and squeeze out the oil; then recook the mash and it is delicious cold with salad. It is a dish that involves much labour in preparation so you will not



A. J. Thornton



by courtesy of the Bermuda News Bureau

One reason for the strong family resemblance of Bermudian houses is the coral stone which has always been the principal building-material. It can be quarried almost anywhere in the island and is then soft and easily sawn but hardens with age. It is used in thin slabs for roof-tiles

find it often. Turtle-steaks are easier to sample and turtle-soup is as well known to the islanders as to Lord Mayors.

Another delight many Bermudians take for granted is their architecture. A splendid number of 17th- and 18th-century houses survive and all modern Bermudian building follows their elegant and practical pattern. For the merchant-mariners, home was not only their castle, but their warehouse, shop, water-catchment and long-term larder. Therefore most houses are designed with ample cellars, and the roofs are made of stone tiles which are covered with lime cement. Every year, by law, Bermudians must lime-wash the roofs which catch their water-supply. In practice, houses are usually smartened for Easter and again for Christmas. Often the walls are whitewashed to match, but some are coloured sugar-almond pink, blue or green. One feature has been rendered obsolete by refrigerators, and that is the buttery—a tiny, adjacent building with a high stepped roof. This was the necessary

larder to protect food from the humidity of the south-west winds.

The houses of Bermuda are seldom more than two storeys high and snuggle down from the Atlantic winds. They are built of coral limestone, so soft when it is quarried that you can cut it with a saw; it hardens, however, after several years' weathering. It is surely a wonder that you can dig stone to build your own house out of your garden; indeed there are several famous quarry-gardens in the island.

Some ten years ago, disaster struck picture-book Bermuda. A disease swiftly and inexorably killed all the cedars. Gaunt and grey their corpses stood around: the Bermudians hardly had the heart to clear them away. At last they have made progress with this sad job and have planted the quick-growing Casuarina, the glorious red royal Poinciana, and many other beautiful flowering trees. The islands look even more lovely, and you can now glimpse the fairy-tale houses once almost too closely guarded by the thick green cedars.



The character of Bermudian houses derives mainly from the coral stone but there are other common features. One results from the hilly nature of the islands: houses are frequently perforce built on slopes, with living- as well as bedrooms on the upper floor so that the front steps, known locally as "welcoming arms", lead to the first floor; the lower floor, usually devoted to cellaring, being cut into the hillside. The shutters, hinged from the top, are another feature and (right) so is the buttery, the small pyramid-roofed structure semi-detached from the main building and used in former times for storing food. But the most characteristic feature of all is the gleaming whitewash on the roofs which was thought by Mark Twain to resemble the icing on a cake



Twenty-square-mile Bermuda can accommodate 4000 visitors at a time, so two or three of the larger hotels tower in modern skyscraper fashion. But the shopping-streets of Hamilton content themselves with the four-storey veranda'd buildings of their forefathers. Prices run high, for everything is imported and import-duties, not income-tax, supply the revenue.

Talking with an American honeymoon couple in the only restaurant we could find serving any sort of meal under £1 a head, we all grumbled that Bermuda would price herself out of the market. But strangely enough, in spite of £10 a day in a first-class hotel, and £2 10s. for bed and breakfast in the most modest guest-house, Bermuda is still top-favourite holiday-island for Canada as well as the United States. During 1956,

when I talked to the honeymooners, there were 95,020 visitors to the island; in 1958 there were 108,439 so we must have been wrong in supposing that Bermuda would run into economic difficulties.

Discussing finance with the Manager of one of the two big banks, I found it slightly incongruous to be received by him in Bermuda shorts and I averted my eyes from pink knees as he quoted the island's proud boast: that they earned more hard dollars per head than any other part of the Commonwealth.

There has been an American base in St George's since the Roosevelt-Churchill destroyer-bases deal of 1941. But Bermuda's links with the United States have always been close. There were the 100 barrels of gunpowder smuggled out to General

St Peter's, the parish church of St George at the eastern end of Bermuda, is reputed to be the oldest Anglican church in the New World. It was founded in 1612 though the present building dates from a century later. St George, the capital until 1812, was for long Bermuda's chief port





Flatts Village, by the bridge across the entrance to Harrington Sound on the North Shore, is a delightfully 'amphibious' little place where two or three new hotels have sprung up in recent years close to Bermuda's famous aquarium. For transport, boats are as useful in Bermuda as cars

Washington during the American War of Independence; and in the American Civil War skippers of blockade-runners could earn \$5000 for one return-trip from Bermuda to North Carolina. In 1852 "a hotel of thirty-two rooms to accommodate Yankee visitors" was projected. Nowadays Bermuda has almost year-round holiday-traffic. Britons and other Europeans go to the Summer Islands to escape their own winter: American colleges have staggered Easter vacations so when the Madonna lilies bloom the youngsters throng the island for six weeks; in summer Americans and Canadians are joined by visitors from the West Indies escaping their hot and humid months. Thus only a few weeks remain for Bermuda to plan and rebuild for next season.

Wages for a master-mason are 7s. 6d. an hour and the excellent coloured servants earn about £7 a week. They share in a modest way the island's continuing prosperity but they do not mix, their schools are separate. Descendants of Portuguese indentured labour used not to mix either: their forefathers had

been brought from the Azores to work the plantations after the emancipation of the slaves in 1834. But during World War II these Portuguese fought and made friends in the forces and now at last they are becoming integrated with other Bermudians of European origin.

Another recent milestone in Bermudian life was the advent of the internal-combustion engine. Until 1946 no motor-cars were allowed, and many prophesied it would be the end of their idyllic life. But cars are wisely limited to 20 m.p.h. and 14 horsepower, and taxis with fringed tops borrowed from the old Surreys fit as happily into the island scene as variegated lady-birds. And I dare swear that Tom Moore, who was charmed by the Summer Islands in 1803, might still write:

Oh! could you view the scenery dear,
That now beneath my window lies,
You'd think that Nature lavish'd here
Her purest wave, her softest skies,
To make a heaven for love to sigh in,
For bards to live and saints to die in!

The Gilbert Islands

by NANCY PHELAN

Among the islands which H.R.H. the Duke of Edinburgh is scheduled to visit are the Gilberts. The author's book about them, Atoll Holiday, was published in February 1959 by Angus and Robertson

"WHY on earth are you going to the Gilberts?" my fellow-passengers kept asking. "Whatever made you choose such a place? Fancy going there for a holiday. What a peculiar place to go to . . . There's nothing there."

There was no reply to give, other than the real reason which was too simple: I wanted to go.

The Gilbert Islands are a group of atolls, which, together with Ocean Island, the Ellice, Phoenix and some of the Line Islands make up the Gilbert and Ellice Islands Colony. The Colony lies both north and south of the Equator and east and west of the International Date Line, and with the exception of Ocean Island all are coral islands.

It is not easy to visit the Gilberts and few people who are not government officials or missionaries ever see them. Permission to enter the Colony must be obtained from the Resident Commissioner and even if this is given, transport is difficult to arrange. Much of their charm, for me, lay in the fact that there are no tourists, no hotels or boarding-houses to accommodate visitors and except for occasional anthropologists, nutrition experts and relations of government officials the islands are undisturbed by the outside world. I was lucky, for I worked for a former Resident Commissioner and it was through him—and his enthusiasm—that I was able to go there.

Like most Europeans arriving in the atolls for the first time, I, accustomed as I am to being surrounded by land, found myself in a very strange world: it is the sea and sky that dominate the islands and land is the least important element. Time has nothing to do with clocks but is merely a question of light and dark; fruit and vegetables are obtainable only out of tins; transport is by launch or canoe instead of by car or bus.

Atoll life is free and leisurely and takes place against a background of peace and beauty, for these islands, so featureless from the sea, are found, at close quarters, to be full of subtle and delicate contrasts of colour and form, all emphasized by the brilliance of coral sand and the incredible colouring of the lagoons.

Of the sixteen Gilbert Islands only a few conform to the popular idea of an atoll as a circle of land enclosing a lagoon. The majority are long narrow strips of land divided into small islets by "passages" or channels which may often be crossed on foot at low tide. When, therefore, one speaks of an island in this area one means a collection of islets. Some of the islands are quite small and others may be anything up to thirty miles long; but all are flat and low, no more than fifteen feet above sea-level and only a couple of hundred yards in width. All are surrounded by a reef, a coral shelf which on one side encloses a lagoon, on the other holding back the open sea where it breaks close to the shore.

The Gilberts, and the Colony as a whole, are administered through a Resident Commissioner, stationed at Tarawa, the capital. A system of Island Councils, which are elected by the people, carries on native local government in a form evolved from traditional Gilbertese practice. In the few islands where a hereditary local royalty has survived from earlier times, the kings are entitled to speak and vote at all sessions of the Island Council. In the matter of kingships there seems to be a happy compromise between traditional and modern life. For example, the King of Butaritari lives in a palace and still has considerable influence over his people and, at the same time, acts as Native Magistrate, thus participating in a democratic form of government.

At government headquarters one finds the various sections of the administration spread out on different islets: the Resident Commissioner on one, the Cooperatives Officer on another, the Department of Education on a third and the Health Department on a fourth. Launches run across the lagoon like buses, carrying passengers and mail, and invalids go to hospital in a sort of aquatic ambulance. Though these things often cause difficulties for government staff they give a charming air of informality to official procedure.

The people who inhabit these islands are Micronesians, the people of the tiny islands, and are believed to be a mixture of Indonesian and Polynesian blood. (The Ellice Islanders are Polynesians.) It is said that they came



All photographs by Nancy Pheasant

(Above) The royal palace at Butaritari, one of the northernmost of the Gilbert Islands and one of the three which still has a hereditary king. The kings retain certain rights and precedence and land and they are also entitled to speak and vote at sessions of the Island Councils. The palace consists of several buildings of which the main one is the royal residence. This is a European-type bungalow, contrasting by reason of its unusual neatness with the traditional open-sided thatched Gilbertese houses. Inside, it is rather conventionally furnished with stiff wooden chairs, English china and a portrait of Queen Elizabeth II. (Right) The King and Queen of Butaritari. Na Koriri, the king, who is brother of the last king, performs the duties of Native Magistrate, and at the same time "still has considerable influence over his people"



from the north and passed through the Gilberts to Samoa, where they settled, but were later driven from the latter islands back to their present home. According to their own beliefs their original ancestors were people with white skins who came from the Land of Matang, which is "away in the west". The Gilbertese name for white people is *i-Matang*, or men of Matang, and when Europeans first came to the islands they were greeted as kinsmen.

Despite their isolation from the outside world the Gilbertese are in no sense museum specimens. On the contrary, they are a gay and fertile people and very much alive. A little shorter, a little darker than Polynesians, they have slanting almond eyes and shining straight black hair. Their cheerful philosophical outlook enables them to obtain all possible enjoyment from their lives and to accept the hardships of atoll existence without complaint. These hardships have given them a refreshing air of independence and resourcefulness.

At first sight they appear more reserved than the Polynesians but this impression is superficial and even strangers quickly find that they are friendly and hospitable; though in the material sense their hospitality is limited by their poverty, for they have little to give away, barely enough to live on themselves. Few plants grow on the atolls beyond

the coconut, pandanus, the breadfruit and a very coarse tuber called *babai*, which is like an immense taro. These, with the addition of fish, form the main part of the Gilbertese diet, though those who can afford to do so now supplement them with rice, flour and occasionally tinned meat from the cooperative store. Nutrition experts have declared this diet to be inadequate to support human life; nevertheless the Gilbertese continue to thrive on it, remaining healthy, active and so prolific that their little islands are already overcrowded.

They make every possible use of the coconut as a food, not only drinking the green coconut milk and eating the flesh prepared in a variety of ways, but also using the sap of the tree for toddy. This is obtained by cutting the flowering spathe and tying it so that the liquid drips out into polished coconut shells fixed beneath to receive it. Each family has a toddy tree and morning and evening the men climb up to collect the full cups and leave fresh ones. This performance is accompanied by a strange, loud, unmelodious singing which is a unique and fascinating feature of Gilbertese dawns and dusks.

Since living on an atoll is rather like being on a ship the men are all expert in handling small boats and canoes. The latter, which are sailing-canoes, are an integral part of everyday life but they are also used for the most spectacular of Gilbertese recreations, the





All photographs by Nancy P.

The ocean beach, Bairiki, the coral islet on which are the headquarters of government of the Gilbert Islands. The Gilberts, a remote group of sixteen coral atolls lying athwart the Equator, form part of the Gilbert and Ellice Islands, a British colony. Each atoll consists of a string of islets around a lagoon, some of them up to thirty miles long, some tiny. At low tide it is often possible to walk or wade from one to another. All are low-lying and narrow. Bairiki, with its grey thatched houses among slender coconut-palms leaning forward across the white beach towards the turquoise sea, is the epitome of all that a tropical island should be

The government canoe at Tabiteuea, one of the atolls in the Southern Gilberts. As a rule its crew consisted of a captain assisted by the atoll's only prisoner as part of his penal servitude. Transport between the atolls is normally by the little Colony steamers which carry passengers and collect the copra which is the Gilberts' only export. Next in size come the launches. These serve the islets of each atoll and really perform the duties of buses and post-vans. Then come the outrigger canoes which, apart from the government canoes, are privately owned and often used for racing as well as passenger-carrying. Sailing in them is a wet and exciting business





Boat-building at Abaokoro, one of the islets of Tarawa. The Gilbertese are good carpenters and of necessity are as much at home in small boats as on land. Their outrigger canoes are rigged with a large triangular sail, formerly of woven pandanus, but nowadays of canvas. They are light, graceful and capable of great speed. They cannot tack but are double-ended and the sail is changed round when they want to go about. The outrigger is kept on the windward side and one of the crew moves over it so that it just skims the water's surface



Gilbert Islanders performing the ruoia. The dance most often seen in the Tarawa area (that is, nearest to governmental and other official influence) is the batere, a cheerful and unorganized get-together which has come from the Ellice Islands. The ruoia, an old Gilbertese dance, has disappeared from many of the islands, discouraged by the missionaries. This performance took place on Utiroa in the Southern Gilberts, the actual scene being the maneapa or village meeting-house. Starting almost absent-mindedly, it slowly works up to a final pitch of intensity, accompanied by raw, primitive cries; the movements of the girls throughout being formal and ordered while those of the men are wild and savagely exciting



There are two versions of the ruoia, the standing one which was performed at Utiroa, and a sitting one which the author saw in the maneapa at Bairiki when it was part of the Queen's Birthday celebrations and was the climax to a round of formal festivities including sports, speeches, a canoe-race and a garden-party. The presence of the Resident Commissioner and the decorousness of the occasion inevitably caused this version of the dance to be a subdued and rather solemn affair, though it was reported to have become more uninhibited after the official guests had left. The informal celebrations consisted of picnics, bonfires, parties, guitar-playing and singing which the islanders indulged in with immense good humour



A cooperative meeting at Betio, the islet which is the port for Tarawa. The first retail cooperative society was started in the Ellice Islands in 1926 by a European schoolmaster. Five years later the idea was introduced into the Southern Gilberts by H. E. Maude, then a young District Officer. The societies flourished and spread all over the Colony and the government has appointed a Cooperative Societies Officer who works with them, assisting their development and expansion

A cooperative barge loaded with pandanus thatch to be shipped aboard the inter-atoll Colony steamer. There are no private traders in the Gilberts now, all trade being in the hands of the Gilbertese themselves directly through their own cooperative societies or through the government-operated Cooperative Wholesale Society which markets the products of the Islanders' societies and also provides them with trade-goods. The C.W.S. has its own ships, caf  s, a sawmill and a carpenter's shop





Gilbert Islanders waiting for the inter-island motor-launch. The Gilbertese are inveterate and imperturbable travellers though they are very prone to sea-sickness. When journeying to visit friends and relations in other parts of the Group they take the whole family, with sleeping-mats, bundles of food, cooking-utensils, guitars, chamber-pots, umbrellas and heaven knows what else. They camp in the village maneapa, sometimes staying for a year or two before returning home. The launches plying between the islands are loaded down with these cheerful people who give them a party air, despite the fact that officially they may well be delivering mail or cargo

sailing-races for which the islands are well known. These are an exhilarating sight for the canoes move through the water at an astonishing speed, the large sail balanced by a crew member who moves cat-like back and forth constantly on the outrigger, keeping it in position. In some races, when enormous sails are used, I have seen numbers of people weighing down the outrigger. Even an ordinary everyday journey in an outrigger canoe is an exciting and very wet experience, as I know to my cost, having been drenched to the skin again and again in the course of a fairly short trip across the lagoon from one islet to another.

Everyone must have a canoe for fishing but only a few Gilbertese can afford a specially designed racing-canoe as well. These boats, which are very beautiful, are built by distinguished craftsmen and the completion of the work is usually celebrated with a feast.

Gilbertese villages are clean and attractive places, the oblong thatched houses often set up on platforms and with open sides which are screened by coconut venetian blinds. Village life is cheerful and unburied. During the day, while the men are away fishing or working in the forest cutting copra, the women clean their houses, bake bread, prepare food and make mats. The children help with the work, sweeping up the leaves, carrying firewood and minding the babies. Most people take a siesta in the hottest part of the day and in the evening they go to the beach to watch the sunset, gossip, fly their kites or sail their model canoes. A good deal of village life, both work and pleasure, goes on at night. People often fish all night or stay up late dancing and singing or making love on the beaches.

The leading figures in the villages are usually the *kaubure* or village headman, the native policeman and the many old men who act as elders, oracles or sages. Age is greatly respected and a very exalted state among the Gilbertese is to be a *unimane* or old man. (*Te Unimane*, the Old Man, is the Gilbertese name for the Resident Commissioner.) The policeman dresses up in uniform, a brown *lava-lava* (kilt), on special occasions but for the most part he is indistinguishable from the other men, in an old *lava-lava* or shorts, often with a handkerchief or piece of rag tied round the neck or forehead.

In the Tarawa area, near the centre of government, most of the women wear cotton dresses or *lava-lavas* but on the outer islands they wear very short green grass skirts. In some districts the missionaries have persuaded them to wear white cotton vests also but

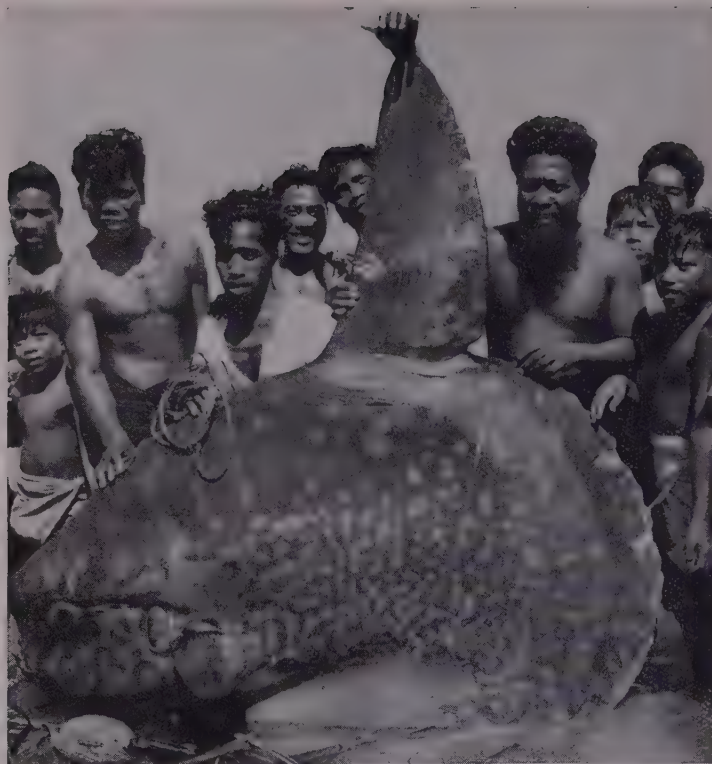
the girls are often rather lax about obeying.

The centre of village life is the *maneapa* or village meeting-house, which in former times was associated more with ceremonial procedure than it is now. In between the actual meetings which give the building its name the *maneapa* serves as a village hall, wayside inn, social centre or just a place to rest in. Dances are held there, little children play marbles, old men take their siesta, working-parties assemble to make mats and women wash, cook and sew in its shade. Families often camp in them for long periods, each one occupying its own area where they rig up mosquito-nets and let down blinds for privacy. A Gilbertese who has property or relations on another island often takes his family for a visit, sleeping in the *maneapa* and living on the food from his own land.

This sort of visiting goes on all the time, since everyone has relatives scattered up and down the Group. Whenever a small ship sets out on an inter-island trip it is overrun with deck-passengers. These people all come equipped with sleeping-mats, baskets of *babai*, coconuts, fish and often small pigs. They also bring black umbrellas, guitars carried in embroidered pillow-cases and chamber-pots; and with these things, and many small children, they swarm up the sides of the ship and settle themselves for the voyage, rigging up tents, boiling billies, cooking, playing guitars and suckling babies. Though often desperately seasick they recover as soon as the ship stops for loading, brightening up in a matter of seconds, taking little snacks, singing hymns, chattering, laughing and fishing over the sides, or eating raw fish as it comes from the sea.

Like other Pacific Islanders, the Gilbertese love to sing and dance and this is by no means confined to the young. Anyone may join in and the strong rhythms are hammered out on kerosene tins, accompanied by strange chanting. The dance most commonly performed now is the *batere*, which comes from the Ellice Islands, but far more spectacular and exciting is the *ruoia*, the ancient traditional Gilbertese dance in which every movement has a special significance. It is an extraordinary combination of primitive vitality and highly formalized gestures but since it and its accompanying chants are associated with magic and spells it has been discouraged by missionaries and is now rarely seen, except on some of the outer islands.

Magic and spells are very real to the Gilbertese and are still practised secretly throughout the islands, the most common ones being connected with love or the death



(Left) Gilbert Islanders with a sun-fish they have just landed. Fish, which provide the islanders with a main part of their diet, are plentiful and the Gilbertese are excellent fishermen. They fish on the reefs, in the lagoons and far out to sea. Along the ocean shore of the atolls they use fish-traps. These arrow-headed enclosures are built of coral rock into which the fish swim at high tide, becoming trapped when the water goes down. (Below) A girl surrounded by the other main items of Gilbertese diet: on the right, coconuts; in the basket, babai, a taro-like tuber; and, under her elbow, the fruit of the pandanus tree. The leaves are babai, and she is husking a coconut. The author found both babai and pandanus fruit most unappetizing, but enjoyed bread-fruit, especially baked or fried



of an enemy. Love-magic is said to be very powerful, though few Europeans have experienced it.

"Gilbertese magic does not work very well on Europeans," I was told. "We think this is because there is too much salt in their diet. It makes a resistance."

Nevertheless, though there are naturally some remedies for illnesses or poisonous bites that the Gilbertese prefer to keep from white people, they are prepared to use others to help Europeans provided that their desire for secrecy is respected. With these they have effected spectacular cures when European drugs and medicines have failed. A typical case was that of an *i-Matang* who had been bitten by a stonefish and was in agony for days, unable to find relief even in morphia. A Gilbertese friend cured her but would tell no-one what he used, even going by night secretly to the forest to find the leaves or herbs that effected the cure.

Their flair for healing, which also comes out in a talent for massage and bone-setting, is given an outlet in the system of native medical practitioners. Young men are sent to the Central Medical School at Suva, in Fiji, where they receive a training that qualifies them to carry out routine medical work and perform minor operations. They then return to their home islands with the title of Assistant Medical Practitioner and are appointed either to the central hospital at Tarawa or stationed on the outer islands. When A.M.P.s on remote islands have been obliged to handle more advanced cases than their training provides for, they have usually proved capable of dealing with the emergency.

Although all the Gilbertese are now Christians they retain a deep respect for their old pagan gods and keep their traditional view of life after death. After death the spirits of the Gilbertese go to Little Makin, the northernmost island of the Group, where they feast and dance for three days before departing to the next world. It is said that there is a beach on this island where the dead appear and anyone seeing a friend in this place knows at once that that friend has died. Since everyone must go to Little Makin sooner or later there is a constant stream of ghosts moving up the atolls, from south to north, sometimes invisible, sometimes revealing themselves to the living.

"It is a long journey from the south," explained one of our Gilbertese friends, who had formerly been a London Missionary Society deacon and is now a member of the Roman Catholic church. "People get very

tired; but there are *maneapas* for them to rest in on the way."

"*Maneapas* for ghosts? But where are they?"

"Oh," he said, waving towards the lagoon, "we can't see them, but they're there . . . perhaps on the islets, perhaps out in the lagoon. Just because you can't see them it doesn't mean they aren't there. It's the same with the ghosts."

Ghosts are liable to be encountered anywhere, at any time, day or night. Not only may the spirits of the dead be seen but often those of the living, as in the case of the village policeman on Tabiteuea, who was seen by many people walking through the forest with a lantern when there were witnesses to prove that he was actually miles away at that time, in another village.

"Of course he didn't answer us when we spoke to him," said our cook, who told us the story, "so that was how we knew he was a ghost." Ghosts never answer when you speak to them but look right through you as though you were not there.

Despite their ghosts and magic the Gilbertese are very matter-of-fact people in many ways and take life as it comes. This shows in their attitude to the war, for though they experienced suffering and humiliation at the hands of the Japanese during World War II they now behave as though the occupation had not happened and rarely mention the subject unless asked about it.

"It's over now; the Japanese have gone," they say. "It was not very nice when it happened but now we don't think about it."

"How did you get on with the Japanese?"

"They were funny people," a Gilbertese friend told us. "Small . . . very small, even smaller than we are. Yet they seemed to think we should respect them. They said we must obey them and look up to them."

"And did you?"

"How could we? Why, we saw their soldiers eating with their fingers, just like we do. They sat on the floor to eat, like we do. How could we look up to such people? They were no better than we are."

"Did they treat you badly?"

Our friend shrugged. "They were not very nice. They said that we must give them everything we had . . . all our food and the things left behind by the *i-Matang*. We were forced to obey. Of course," he said with a broad smile, "they didn't know that we had buried many things which they never found. When the British came back we were able to dig them up and return them."

Although the Gilbertese people have little



One of the favourite recreations of the Gilbert Islanders is sailing model canoes. These are fragile little boats with huge pear-drop sails and a long outrigger pole weighted with coconuts

use for money, in the European sense, they have for some years been participating in the economic life of their islands through native cooperative societies. These were first started in the Ellice Islands and then brought to the southern Gilberts. Now they have spread all through the islands. Foreign traders no longer exist and trading is carried on by the Gilbertese themselves, either directly through the native societies or through the Colony Wholesale Society, which was established by the government after the war to market the products of the societies and to obtain for them trade goods needed for the stores. The administration has also appointed a Cooperative Societies Officer to work with the societies.

The Colony Wholesale Society, which has its headquarters on Betio islet, at Tarawa, has several ships which move round the Group, picking up cargoes and delivering supplies from the cooperative stores. In the Central Gilberts, where the native societies have formed themselves into what they call the Tangitang Union they also have their own little ships to carry cooperative copra and other goods. The Tangitang also own transit quarters for the use of members, one or two cafés, a sawmill and carpenter's shop, as well as their retail stores.

Ocean Island, the former capital of the Colony and not an atoll, produces phosphates

from its rich guano deposits and gives employment to a labour force recruited partly from the Gilberts. But copra is the only product of the atolls of any commercial value and since in these overcrowded islands many people have little land, and therefore few coconut trees, there is small chance to amass money. For the most part life goes on without it, but for those who desire it for a specific purpose—perhaps to buy a bicycle or a sewing-machine—there are opportunities to earn money by working on the phosphate islands. Each year a ship of the British Phosphate Commission makes a trip round the islands, recruiting labour for Ocean Island and Nauru (the Australian phosphate island). Islanders who sign on do so for a year and at the end of the time are returned to their homes, where they settle down happily again to their fishing and copra-cutting. The taste of a different life does not appear to unsettle them or inspire in them ambitions to leave their own islands.

They are a contented people, fully occupied with their traditional lives, their homes and families. They regard the European way of life with tolerant amusement and often a certain amount of amazement; and while few Europeans would wish for the hardships of atoll life many of them must envy the Gilbertese the deep sense of repose, acceptance and peace that is so real a part of their existence.

The National Parks Commission: What It Can Do

by HAROLD M. ABRAHAMS, C.B.E.

In our January number Sir Stephen Tallents introduced a series of articles, of which this is the last, dealing with the work of three bodies which, through a "peaceful revolution" of our time, have become responsible for the guardianship of different aspects of our national heritage: the National Trust, the Nature Conservancy and the National Parks Commission. Mr Abrahams, who has been Secretary of the National Parks Commission since 1950, shows what it can and cannot do

To the Secretary of the National Parks Commission

Dear Sir,

Ten years ago, on the last day of March 1949, Mr Silkin, as he then was, introduced into the House of Commons the National Parks and Access to the Countryside Bill. "This long-awaited Bill", he said, "will be received with great pleasure by a large number of people all over the country who have witnessed with considerable concern disturbing trends in the development of these islands . . . With the increasing nervous strain of life it makes it all the more necessary that we should be able to enjoy the peace and spiritual refreshment which only Nature can give . . .

"The disfigurement of the countryside has been going on for 100 years or more. We have shacks, ribbon-development, unsightly coastal development, mineral workings, quarrying, power-stations, gas-works, poles and pylons supporting overhead electricity-, telegraph- and telephone-wires, radar and radio establishments, reservoirs, outdoor advertisements, nissen huts, hutments, hangars and other Service buildings. Each of these more or less necessary appurtenances of modern science, progress and civilization makes a great contribution to the disfigurement of the countryside . . .

"The Bill before the House is directed to arresting and reversing these various trends. Its objects broadly are, first, to preserve and enhance the beauty of the countryside; and, secondly, to enable our people to see it, get to it and enjoy it."

Some one-and-a-half hours later, the Minister in his concluding remarks said: "But however good may be the machinery of this Bill as it finally emerges, it is largely machinery. Its success must depend on the courageous, determined and imaginative spirit in which it is carried out by the parties concerned, by the Local Planning Authorities, the Commission, my Ministry and the Government. It has immense possibilities for enhancing the beauties of this island, but even more by providing closer contact with Nature and in improving the physical, moral and spiritual welfare of our people."

Fine words, indeed, Sir. We were promised a new heaven and a new earth, or at any rate that some parts of the earth should be left as God made them. Just as after the First World War, we were promised a "Land fit for heroes"; and as someone subsequently remarked "Yes, and you need to be a blinking hero to live in it."

Nearly nine months later the Bill reached the Statute Book, and within a matter of days your National Parks Commission was set up. Nine years ago!! What has your Commission done "for the preservation and enhancement of natural beauty in England and Wales, and particularly in the areas designated under this Act as National Parks or as areas of outstanding natural beauty"? You have, it is true, designated ten National Parks, and taken an unconscionable time about it. They constitute a total area, I believe, of over 5000 square miles, territory which was to be preserved and enhanced in its natural beauty. What have you done towards enhancing or preserving anything? Cement works in the Peak—a plethora of overhead wires in the Lakes—a 750-foot television-mast in the heart of Dartmoor—hydro-electric power-stations in Snowdonia. You might, perhaps, have been excused for your failings in the early days, but matters have recently become worse, not better. In the last twelve months or so, what have we seen? Two hundred acres in the heart of the Snowdonia National Park given over to an atomic power-station, a project welcomed by the Park Planning Authority, but characterized by the Principal Inspector of the Ministry of Housing and Local Government as "grievous damage to the National Park". Milford Haven, one of the most glorious stretches of water in the country, invaded on both shores by an oil-refinery, an oil-storage depot and an iron-ore stocking-ground which will occupy more than fifteen acres and harbour a stock-pile of two or three million tons of iron ore brought by 100,000-ton vessels.

You call yourselves "Guardians of our National Heritage". What sort of guardians are you? Why don't you do something to stop these and many other horrors? Once more it is an example of "too little and too late".

Yours etc.



Copyright 1911 by the National Parks Commission



The National Parks Commission, in its efforts to preserve and enhance the beauty of our countryside, has to reckon with a variety of industrial and domestic developments which can neither be prevented nor disguised. (Opposite, top) Workings at Eldon Hill Quarry were described in the report of a Ministry of Housing and Local Government inquiry as having seriously damaged the Peak District National Park, whose qualities when undefiled are well exemplified by (opposite, below) the pastoral charm of Milldale village in Derbyshire. Similarly, the Commission has drawn attention to (right) the network of overhead cables in the Lake District, which is already gravely disfiguring its world-famous scenic grandeur, so characteristically displayed at Hawes Water (below), in Westmorland. If enough money could be found the National Parks Commission would like most cables, except for those of very high voltage, to be laid underground



THIS is an imaginary letter, but I am sure from the correspondence we receive and the criticisms made from time to time in the Press, that it represents a pretty widely held point of view. Let us look for a few moments at what the Commission can do and have done. I say first of all "*can do*", because one of the misconceptions which exists is that the National Parks Commission have the power to step in and say to all these developments "*NO*", if they only had the courage to do so.

Now whether a particular piece of development is allowed to go on depends on the decision of the authority entrusted with the power to make the decision, in the first instance the Local Planning Authority and ultimately the Government, through the Minister of Housing and Local Government or in the case of, for example, power-stations, the Minister of Power. The Commission have no executive powers in this matter at all. Their duty, as laid down by Parliament, is to advise Ministers and Local Planning Authorities about proposals. It would have been theoretically possible to set up a body with overriding executive powers, but it would have been quite impractical to do so. Parliament could have substituted the National Parks Commission for the Planning Authorities (for the most part the County Councils) in National Parks and other specified areas, but even if it had been decided that this should be done, the ultimate power would still have had to reside in the Government. And the vast majority of these most important decisions have been made on behalf of the Government after Public Inquiries.

Since the Commission were set up, they must have considered over all not far short of 10,000 "development applications" referred to them for comment, hundreds of comparatively trivial importance, but many of real national significance. The function of the Commission has been and is to make the strongest representations about these proposals to those entrusted with the decision, and the facts will show that they have not been neglecting their responsibilities. It is the so-called "failures" of the Commission which are there for all to see, the occasions when their advice has not been taken. Their "successes" receive little publicity, but there are hundreds of cases where by negotiation with the promoters, or advice to the Planning Authority, or representations to Ministers, the Commission have played a not insignificant part in preventing a development to the detriment of the countryside, or secured that

very much more consideration was given to the way in which it is carried out.

It is quite unrealistic to suppose that in this densely populated country it will ever be possible to isolate completely the whole of any National Park. National Parks are places where people live and work. Small-scale local industry can be accommodated where it is needed, provided that care is taken to fit it into its setting. But large-scale industrial installations are another matter. The Commission have never hesitated to challenge these intrusions into the quiet and beauty of the countryside, and to claim that there is no justification for sacrificing the essential character of unspoilt country, unless, in the particular case, there is a proved national need for so doing.

But the decision rests with those who are democratically elected, be it locally or nationally, to carry out the "will of the people". The trouble is that not enough pressure is exercised by the public. District Councils, County Councils and Ministers of the Crown, all alike are very sensitive to political and public pressure. There is far too much apathy about the beauty of the countryside; the public's scale of values still leaves much to be desired.

But some real progress can be observed. In the North Wales Hydro-Electric Power Act, 1952, which authorized the British Electricity Authority to extend their existing hydro-electricity schemes at Dolgarrog and Maentwrog in the Snowdonia National Park, a section was included "for Preservation of Scenery and Amenities". This section (included, incidentally, following representations by the Commission) enjoined the Authority to have regard in the construction and maintenance of the works authorized by the Act "to the preservation for the public of the natural beauty of the district in which the works are situate and to the enjoyment thereof by the public". This section, which also provided for the appointment of a landscape consultant and reference of all his recommendations to the Commission and the Planning Authority, has provided the precedent for many other Private Acts. It is not unreasonable to predict that in time a landscape consultant will be considered just as essential in the carrying out of a major development as an architect or engineer. And what a difference their advice and ideas can make! In the 1957 Electricity Act, a section was included "for the Preservation of Amenity", by the provisions of which the Central Electricity Generating Board and



By courtesy of Devon County Council

(Above) A year's refuse collected from Dartmoor: sixty tons of litter, comprising even scrap-iron dumped by thoughtless citizens. An important task of the National Parks Commission is to combat this squalid behaviour, which constantly menaces such beauty-spots as (below) Widecombe-in-the-Moor

Crown copyright, by courtesy of the National Parks Commission





Sharp tins and bottles left in grass
May injure animals that pass.
Protect them, and preserve the view,
By taking litter home with you.

UNWANTED RUBBISH CAN EASILY BE CARRIED AWAY IN A BAG, OR IN THE
POCKET, FOR DISPOSAL AT HOME.

One of the 750,000 posters issued by the National Parks Commission in the anti-litter campaign

all the Area Boards must "in formulating or considering any proposals have regard to the desirability of preserving natural beauty" and shall "take into account any effect which the proposals would have on the natural beauty of the countryside". Some may regard this as just a kind of pious exhortation, but it is a beginning and an important beginning—the real recognition that countryside preservation is something which must not be ignored. The Commission's hands have certainly been greatly strengthened in the discharge of their responsibilities by these statutory acknowledgements that landscape beauty is something that matters. When we have established that landscape beauty is a national asset comparable to coal or cement or electricity or what you will, then more weight will undoubtedly be given to this aspect in the solution of problems of where and when or whether a particular development is to be permitted.

Public opinion is ultimately what will decide these issues but, alas, the "masters" are sadly at fault. Look at the problem of litter which defaces so much of the countryside. For the most part the public don't care. In Dartmoor, for example, it took a contractor ten weeks to collect some fifty to sixty tons of litter left about by the public. This kind of thing is a very common experience at hundreds of beauty-spots throughout England and Wales. What are the National Parks Commission doing about *that*? The Act enjoins them to use suitable methods of publicity for the prevention of damage in National Parks



and for encouraging a proper standard of behaviour on the part of persons visiting National Parks and other areas. It also lays down that the said methods shall include the "preparation and publication of a code of conduct for the guidance of persons visiting the countryside". They did prepare and produce *A Country Code* in May of 1951, and something like 70,000 copies have been sold. The *Code* consists of ten maxims, which, if followed, would certainly improve not only the condition of the countryside but the relationship between townsfolk and those who dwell in the country. "Leave no Litter" is one of these maxims. The code has been reproduced in a variety of forms and nearly three-quarters of a million humorous posters have been circulated to schools, clubs and so on. We have also produced what is called a "sticker" in the form shown above. These stickers in various sizes are to be seen in tens of thousands, in buses and elsewhere. Some of you have, I hope, seen the symbol on one of the millions of envelopes used to send licence reminders to motorists. The 1958 Litter Act, making the deposit of litter a 'national' offence, as contrasted with an infringement of a local by-law, is already having some impact on the public. In the aggregate this litter-problem, so symptomatic of the thoughtless indifference of the public, is devastating in its effect. But if only each individual would take just a little trouble, it could be solved overnight. Apart from the Dartmoor collection mentioned above, the Park Planning Authorities carry out litter-campaigns and appoint voluntary wardens, while a most successful Conference held in

Every visitor to the National Park can help to ensure that its beauty remains unspoilt by keeping the rules of

THE COUNTRY CODE

GUARD AGAINST ALL RISK OF FIRE

FASTEN ALL GATES

KEEP DOGS UNDER PROPER CONTROL

KEEP TO PATHS ACROSS FARM LAND

AVOID DAMAGING FENCES, HEDGES AND WALLS

LEAVE NO LITTER

SAFEGUARD WATER SUPPLIES

PROTECT WILD LIFE, WILD PLANTS AND TREES

GO CAREFULLY ON COUNTRY ROADS

RESPECT THE LIFE OF THE COUNTRYSIDE



Crown copyright, C.O.I.





Both photographs from British Travel & Holidays Assoc.

Positive action which is promoted by the National Parks Commission and executed in the Parks by the responsible Planning Authorities includes providing car-parks where vehicles and people can concentrate and not spoil the view for others. (Opposite, top) Tarn Hows car-park in the Lake District. The National Parks Commission also works in close cooperation with bodies like the Youth Hostels Association whose activities the Commission can help to foster and whose members in turn can further the Commission's aims. (Opposite, bottom) The Snowdon Ranger Youth Hostel, below Snowdon. Another form of action encouraged by the National Parks Commission is providing Information Centres such as (above) the one in Snowdonia at Llanrwst in Denbighshire, where (left) climbers may study the terrain before setting out on an expedition



the Lake District last year came to the conclusion that the provision of litter-receptacles was never likely to be effective. Not only are they apt to produce a rash of unattractive intrusions into the landscape, but the provision of them at hundreds of remote spots where the offences occur is quite impracticable, not to mention the impossibility of emptying them. The Conference was unanimous in its conclusion that the right policy was to induce people to take their litter home.

This aspect of the work of the National Parks Commission, in their supervisory capacity, and of the Park Planning Authorities on whom lies the burden of endeavouring to make the National Parks Act something more than just another statutory enactment, is rather a negative one. I am not decrying its importance. Certainly the solution of the litter problem would "enhance the natural beauty of the countryside", just as the removal of eyesores in the shape of disused tin buildings and the tidying up of derelict airfields is of considerable significance. And in all conscience many years' work in this direction will be required. In the summer of

1957 a party of Cambridge undergraduates, organized by Michael Dower, the elder son of the late John Dower (whose Report published just after the end of the war paved the way more than anything else to the achievement of the National Parks Act) and Mrs Dower, who is now Deputy Chairman of the Commission, cleared a disused gun-site in the Pembrokeshire National Park. This pioneer effort has been repeated elsewhere, and there is abundant opportunity for a very wide extension of such voluntary work. But what of the positive work? What is being done to provide facilities for the enjoyment by the public of the National Parks?

The Commission themselves have very limited powers in this direction; again the primary responsibility rests with the Park Planning Authorities, and the Commission's task is to advise, recommend and encourage. Car-parks and lay-bys are being made, small things individually, but the aggregate over the ten Parks is considerable, and their provision is only just in its infancy. Caravan and camping sites are being provided by the Planning Authorities, supplementing those which owe their existence to private

The public are given extensive opportunities of access to open country in National Parks as elsewhere. The Planning Authorities have to persuade visitors to the Parks to respect owners' rights. (Below) The Head Warden of the Peak District Park telling a rambler about the Country Code

un copyright, C.O.I.





Crown copyright, C.

Much can be done to make buildings blend with the landscape, as by the traditional style adopted in (above) the Hawsgarth Housing Estate, at Hawkshead in Lancashire. A landscape consultant designed (below) this mountain dam, in the Dolgarrog hydro-electric scheme, to harmonize with its surroundings

By courtesy of S. Colwyn F.





enterprise. Countryside courses are being held, two or three in each year in various Parks, with lectures on the history of the Park and the many local attractions to be seen. Information Centres are slowly springing up; Park signs by which the visitor knows that he is in one of the ten National Parks are becoming commonplace, and indeed some may feel in the words of the Grand Inquisitor that they are "in point of fact too many". The credit-squeeze, so-called, has not only reduced to a bare minimum the amount of finance which the Exchequer has been willing to provide (the Act enables 75 per cent of the cost of such ventures to be paid by the Treasury, with 25 per cent coming from the Local Authority), but the whole atmosphere has been one of discouragement. We may not unreasonably expect that things will now be a little easier, but we come back to what I have said earlier in this article, that the public are ultimately to blame in that their apathy results in far less being done than could be done if they willed it. What could not be accomplished if, say, £500,000 were

to be spent each year on National Parks!

It is not easy for anyone who is playing a part in carrying out a policy, as I am, to step back and consider in a really objective way how useful a job is being done in preserving the countryside for the public to enjoy. Nine years is, after all, a comparatively short time for a new idea to make a deep impression on public opinion and it is very much easier to see what has not been done than to recognize what has been accomplished. It is well to remind ourselves how recently in our history there has been any form of planning control at all. But for the work which followed the passing of the Town and Country Planning Act of 1947 and of our own Act two years later, I believe the landscape would present a much more depressing picture than it does today. The cumulative effects of planning control have been considerable; and if there is much to criticize and much to condemn, my answer in defence of the Planning Auth-

orities and, if necessary, of the Commission, would be that only an enlightened public opinion, a public opinion that really cares and is not hesitant in vociferously showing that it cares will enable what ought to be done, to be done. It is only when the trend of public opinion becomes powerful enough that full effect will be given to the principle which the present Prime Minister, when he was Minister of Housing and Local Government, enunciated in the House of Commons in July 1952:

In all parts of the United Kingdom, we ought to try and preserve what is one of our greatest assets—the beauty of the countryside—and we should try to make it accessible to the dwellers in the towns. But whereas, in the country as a whole, we must frankly face the facts that, if it is to exist and continue as a country able to keep its population at a high standard of living, proper regard must be had to industrial and material needs—and the creation of wealth is a paramount need—in the National Parks the position is the other way round and the amenity considerations have the prior authority.

I.G.Y.: the Final Stage

by GORDON ROBIN

In two previous articles (April 1956 and July 1957) Dr Robin surveyed the world-wide programme of observations by scientists of many nations participating in the International Geophysical Year. Here he gives some impressions of the way certain observations have been made and collated and indicates possible results. Dr Robin, a physicist, was concerned with preparing British I.G.Y. activities in Antarctica and is now Director of the Scott Polar Research Institute at Cambridge

At the start of the International Geophysical Year in July 1957, after describing the vast preparations and international planning involved, I concluded by saying: "All that remains is for the sun to cooperate also, by turning on some special displays to enable man to grasp at a few more of Nature's difficult secrets."

The sun has certainly done this, as during the past eighteen months more activity on the surface of the sun has been observed than ever before. A high degree of sunspot activity was expected, as the I.G.Y. was timed to coincide with the peak of the eleven-year sunspot cycle, but the all-time record in sunspot numbers has provided an unexpected bonus which will add further value to the results.

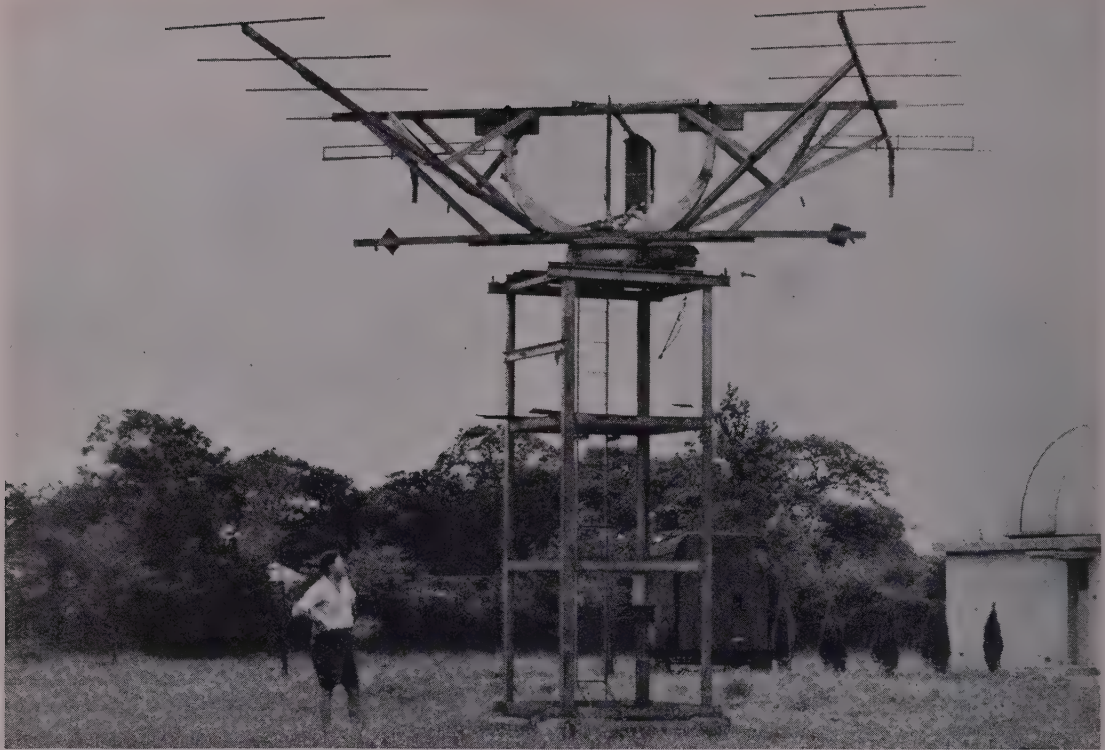
These results are not obvious ones like the result of a football match. The conclusion of the I.G.Y. on December 31, 1958, was the end of the observational period only, and an attempt to describe the results of the I.G.Y. at this stage is rather like trying to give the results of a general election when the voting has finished, but before the counting of votes has begun. At such a stage in a general election, one has certain impressions of the final result from preliminary public-opinion polls, and from various remarks of acquaintances on the way they voted this time. The I.G.Y. is much the same. We know of the more outstanding experiments that have been made, and the individual scientists know the trend of the results of their own observations; but the world-wide pattern of results has scarcely begun to emerge.

Let us trace the story of an auroral display, starting from individual observers and working up to the stage when the world-wide picture is finally obtained.

A few miles outside Manchester, the giant radio-telescope of Jodrell Bank towers over the surrounding farm-land and dwarfs the group of laboratories standing nearby. In one of these squat red-brick buildings sits a physicist, about twenty-five years of age, watching a television-tube which displays

radio-echoes from an unusually active aurora borealis. He is comfortably clad in a sports-jacket and grey flannels, and when his spell of duty ends in two hours he will just be able to reach the theatre in Manchester in time for the show. Not so his colleague who now sits watching a similar set of equipment at the Royal Society Base at Halley Bay in Antarctica. He also is comfortably dressed, but in a flannel shirt, heavy sweater, warm khaki trousers and thick felt slippers. His job of watching the radio-echoes from the aurora australis and noting the changing display in his log-book is identical with that of his Manchester colleague. Outside the buildings at both Manchester and Halley Bay identical large television-aerials rotate slowly as they scan the sky for echoes. Unlike Jodrell Bank, the stout wooden hut at Halley Bay is almost completely covered by snow and the pale glow of the aurora reveals a flat, remote, white and chilly landscape far from the comforts of the theatre and normal life. This, however, does not unduly perturb the young man. In fact it may be the reason why, in spite of long hours of observation, he is able to analyse the data in his log-book with surprisingly little delay and send a report each week to the Royal Society in London by radio.

While he is still on watch he compares notes with the heavily clad visual auroral observer, who has the chilly task of putting his head through a hatch into the cold night in order to keep a running account of the progress of the auroral display entered on his plotting-cards. The aurora is active and much more is to be seen by eye than is shown by the radio-echo display, but the two observers agree that the echoes are apparently coming from the curtain of light high over the southern horizon. Next morning the magnetician remarks that there was some unusual magnetic activity about 7 p.m. last night, and both our observers reply that the auroral display was rapidly increasing in intensity at that time. But there are too many observa-



By courtesy of the Director, Jodrell Bank Experimental Station

Equipment used to study radio-echoes from aurorae at the Jodrell Bank research station. It is a type of radar working on a four-metre wavelength, and can also detect echoes from meteoric trails

tions to be taken and too much equipment to be maintained to study this relationship further on the spot, and the possible interest of the phenomena observed is deferred for a more detailed examination after the I.G.Y.

The weekly report of the scientific activity at Halley Bay is delivered by a telegraph messenger to the I.G.Y. office in a building behind Burlington House in London, where it is copied by a typist and sent out to a number of addresses in the United Kingdom, including Jodrell Bank. Here it is possible to employ a larger staff than in the Antarctic and to analyse results as they arrive. On checking back, our sports-coated physicist finds that the display of the aurora borealis that he was watching the previous week, before going to the theatre, started up at the same time as the very active aurora australis reported by Halley Bay. This adds one more observation to the set of comparisons between Jodrell Bank and Halley Bay, which already show that each time the aurora borealis moves south sufficiently to give radio-echoes at Jodrell Bank, there has also been a particularly active auroral display at Halley Bay.

For these comparisons the radio-echo method, which is not affected by the presence of cloud, is superior to visual observations, but the latter are needed to give a detailed knowledge of the types of aurora.

The next step in collecting the material comes with its despatch to one of the World Data Centres, of which there are at least three for each scientific discipline. One of these is the Balfour Stewart Auroral Laboratory at Edinburgh University. It is responsible for the collection and reduction of auroral observations from most of Europe, Africa and the Atlantic. On arrival after its long sea-voyage in the ship which visits Halley Bay each summer, the packet of visual observations is registered, then put on the file for plotting. In due course a series of maps show the observations from Halley Bay and other Antarctic bases in that sector. Finally these maps will be exchanged with those of other World Data Centres and maps showing the world-wide distribution of each auroral display at different times will be drawn. While this is being done, other centres will be preparing world-wide charts

of changes in the earth's magnetic field and similar studies of cosmic rays and of the ionosphere will become available. Only then will it be possible to obtain the overall picture of the different observations, and to decide how they were related to the mainspring of all this activity, the sun.

The key factor in this picture was the aim of keeping the sun under observation as continuously as possible during the I.G.Y. Some fifty stations have taken part in the programme, of which about half made visual studies, while the others used automatic equipment. In spite of the irregular pattern of stations caused by the uneven distribution of land and sea around the world, and in spite of the random effects of cloud and of instrumental difficulties, this Solar Patrol has kept the sun under observation for 89.7 per cent of the possible hours during the past year. This far surpasses all previous attempts at keeping the solar atmosphere under continuous observation. The results of the Solar Patrol will be published as speedily as possible, as they will form the starting-point of many other investigations.

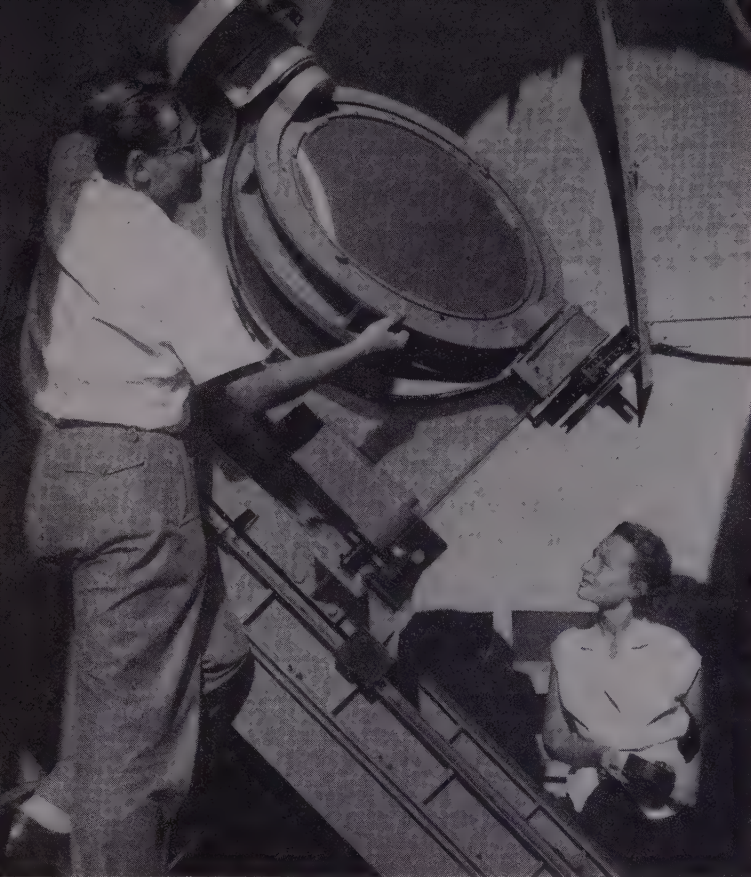
While the group of studies directly affected by solar activity have formed the most important part of the I.G.Y., other geophysical

investigations during the eighteen months have produced results which can be assessed more readily. As a result of the first extensive geophysical coverage of the Antarctic Continent, we have learned a great deal about the deep ice-sheet which covers it. While the Trans-Antarctic Expedition under Sir Vivian Fuchs found that the rock beneath the ice was above sea-level along their route across the centre of Antarctica, even though the ice was over one-and-a-half miles thick at the South Pole, the Americans and Russians have both found ice nearly three miles thick in other places. On the Pacific side of the continent (West Antarctica), the American results so far suggest that a deep ice-filled trench connects the Weddell and Ross Ice-Shelves, thus denoting a physiographical division between East and West Antarctica. However, the final section of the probable trench is being sounded during the present Antarctic summer and until the results of the soundings are available we cannot be sure that this division of the continent is complete. On the more massive section of the continent facing the Indian and Atlantic Oceans (East Antarctica), Australians, French and Russians have all found that under the ice huge ice-filled fjords run inland several hundred miles

Halley Bay, Antarctica. The horizontal radio-aerial in the left background rotates once every five minutes; both aerial and electronic equipment are identical with the units at Jodrell Bank

The Royal Society





ity for Cultural Relations with the U.S.S.R.

The Crimean Astrophysics Observatory is one of the key observatories for the study of solar activity during the I.G.Y. Junior research worker Vera Lvivna Kokhlova and student research worker Vaclav Bumba from the University of Prague are here preparing to take observations with a solar telescope

from the present ice-bound coastline, so that this section of the continent is rather like the Norwegian and Greenland fjord country, but on a more extensive scale, and all covered by a relatively smooth and very thick sheet of ice.

The excellent network of meteorological stations around the coastline and on the inland plateau of Antarctica has enabled the first thorough study of Antarctic meteorology to be made. A good knowledge of general weather-systems has been obtained by standard soundings of temperature and pressure well into the stratosphere, while more sophisticated studies which may improve our understanding of the causes of Antarctic weather have been made. These include measurements of the total ozone content of the air and its vertical distribution, and careful analyses of the amount of carbon dioxide over the practically sterile Antarctic

continent. The very clear air, the high altitudes and the disappearance of the sun for up to six months result in great radiative cooling of the Antarctic ice-sheet, so it is not surprising that in 1957 the U.S.A. Amundsen-Scott South Pole station registered the then world's lowest surface temperature of -102°F . In August 1958, after the U.S.S.R. had established their Vostok station in the vicinity of the South Geomagnetic Pole, they regained their lost Siberian prestige by registering a temperature of -125°F at that base. Clearly work out-of-doors at such bases in winter is no picnic.

Much as these Antarctic endeavours stir the imagination, the rocket and satellite programme has caused the biggest impact on the ordinary citizen. As long as this impact remains mental and not physical people will gaze with wonder and admiration at the rapidly moving man-made star in the evening twilight. The I.G.Y. has shown that the most menacing weapons can be turned to constructive purposes in enabling man to learn more about his planet and its surroundings. The technical features of these launchings need no further description here, and

the sound of radio-signals from the satellites has been heard on most radio-sets. The enormous amount of data conveyed to earth by these signals takes many months to analyse and interpret, but some results are already available. The most unexpected result was the discovery of a high-intensity belt of radiation surrounding the earth by Dr Van Allen of the State University of Iowa and his colleagues. This radiation is due to a zone which has apparently captured large numbers of fast electrons at heights of 1000 kilometres and more above the earth's surface. It was discovered by analysing the cosmic-ray results sent down by the American satellites 1958 Alpha and 1958 Gamma. Further information about this radiation was recorded from the American lunar probe in October 1958 by the 250-foot radio telescope at Jodrell Bank, as a result of cooperation with



Camera

Russian oceanographic research ships have made extensive voyages during the I.G.Y. Members of the Vityaz expedition (above) collecting coral near Fiji. (Below) Russian scientists from the Ob measuring solar radiation on the sea-ice. The Ob also carried supplies to the Mirny base in Antarctica

Society for Cultural Relations with the U.S.



scientists of the U.S.A.

Apart from the mass of information sent by radio from satellites, accurate optical observations of their position have given useful information on the shape of the earth, showing that the flattening at the Poles is slightly less than was previously believed. Much information about the frictional and electrical forces affecting satellites has also been obtained by observing changes in their orbits. Although few results of magnetic measurements by satellites have appeared so far, both these and the radiation-belt discovered by Van Allen will play a large part in explaining the distribution of cosmic rays, auroras, magnetic storms and ionospheric effects, and will consequently fit into the main group of I.G.Y. studies that are affected by solar radiation.

Although only two countries have been able to launch satellites, Australia, Canada, France, Japan and the United Kingdom have joined the U.S.A. and U.S.S.R. in studying the atmosphere to above 100 kilometres by rocket-launchings. The "Skylark" rockets developed by the Royal Aircraft Establishment at Farnborough were transported to the

Australian desert for firing and performed well. One sound-ranging grenade fired at a height of around 120 kilometres to measure air-temperature and wind-speed produced an intense luminescent cloud lasting around three minutes, to the surprise of the observers. American rockets have shown that ultra-violet radiation is emitted from a number of regions of the sky, but this cannot be seen from the earth's surface as it is completely absorbed by the atmosphere. Another American rocket-programme, organized so that rockets could be fired while solar flares were in progress, showed that at the same time the sun became a powerful source of X-rays, which again are absorbed by the atmosphere. In the latter case the absorption takes place around 60 to 95 kilometres above the earth, known as the D region of the ionosphere. This absorption produces so many additional electrons at these levels that it causes radio blackouts on short-wave transmissions.

Such short-term and expensive observations of the ionosphere by rockets form an important supplement to the world-wide network of over 250 stations which measure the

The entire U.S.A. Amundsen-Scott I.G.Y. station at the South Pole was brought by air from McMurdo Sound. The prominent plastic dome houses a radio-theodolite for tracking meteorological balloons

Official U.S. Navy photograph

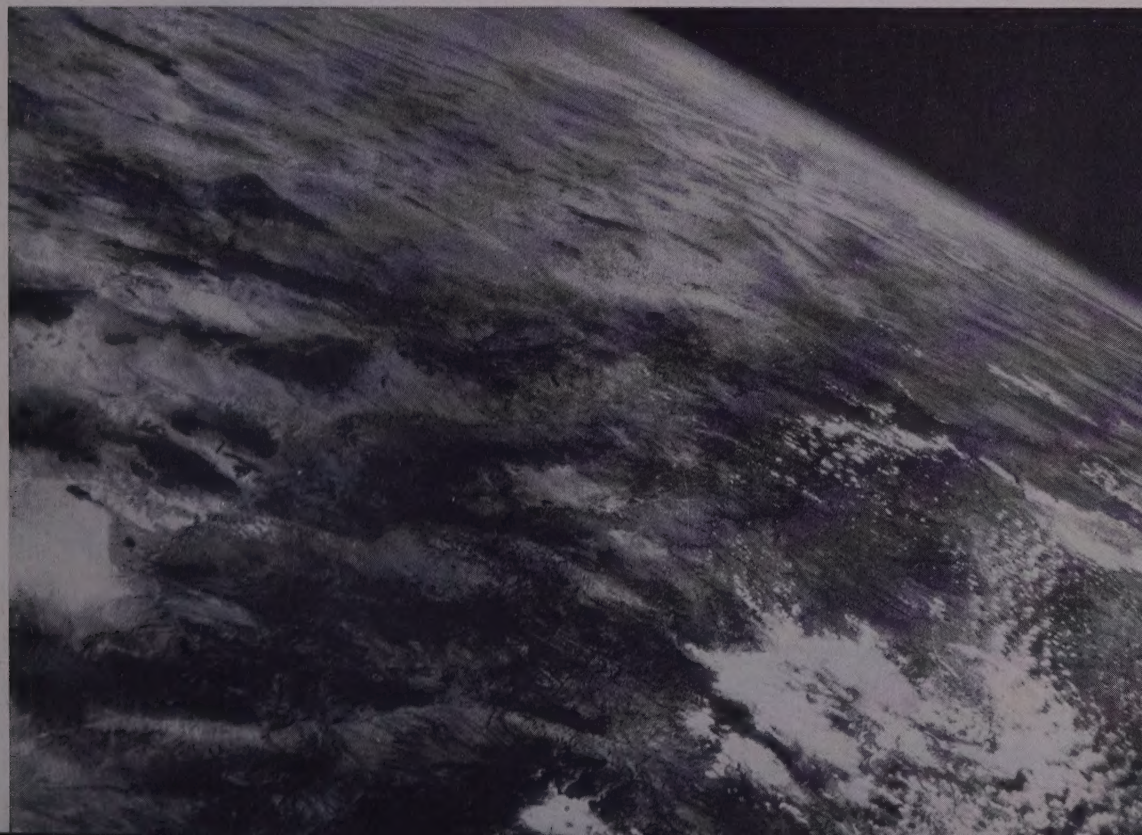


(Right) Firing an Aerobee-Hi research rocket from the U.S.A. I.G.T. launching-site at Fort Churchill, Manitoba, Canada. The launching-platform is set indoors because of the extreme cold during winter months and the need to maintain rockets in readiness for firing at the time of solar flares. This type of rocket carries a payload of 150 lbs weight to an altitude of 150 miles, and thus can carry instruments through an auroral display. The aerials on either side of the launching-stand track the rocket during flight. Among the instruments which can be carried during flight are automatic cameras for recording the sun's spectrum and for photographing the surface of the earth.

(Below) One such photograph taken from a height of 101 miles by a U.S. Navy Viking Rocket launched in New Mexico. It shows an area of 3000 square miles of New Mexico, Arizona, California and the province of Sonora in northern Mexico. These photographs also give a clear record of cloud-patterns which is of great value to meteorologists



Both photographs by courtesy of the U.S.





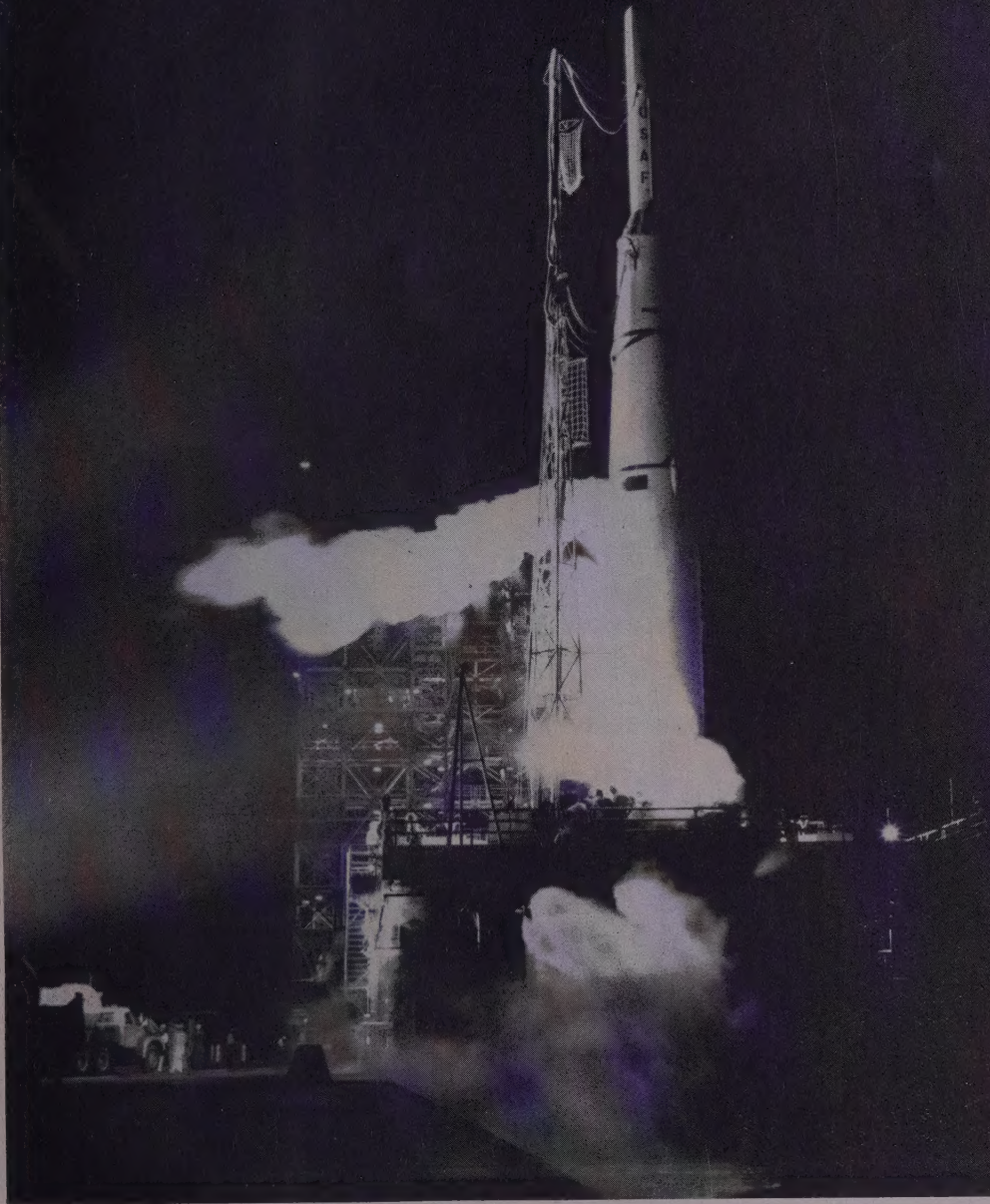
Society for Cultural Relations with the U.S.S.R.

(Above) Studies made by the Russian earth-satellites included the physiological reactions to space-travel of the dog "Laika". These as well as various geophysical measurements were reported by radio.

(Below) A worker at the Kiev University observatory records signals from Sputnik III on magnetic tape

amera Press





By courtesy of the U.S.

The size of the Moon Probe rocket fired in October 1958 by the U.S. Air Force is seen in comparison with the lorry and technicians who are completing final adjustments and fueling. The rocket is 88 feet long, and its final stage carrying various instruments reached more than 79,000 miles above the earth. Although this is well short of the moon, scientific results transmitted by radio from it were most valuable. These included information about hitherto unknown radiation belts whose maximum distances from the earth have been calculated by American scientists as about 2000 and 10,000 miles



C.O.I., Crown copyright

Among the instruments which tracked the U.S. Moon Probe rocket was the radio-telescope at Jodrell Bank. It is the largest instrument of its type in the world: it weighs 2000 tons, moves on bogies round a track of 360 feet in diameter and the reflector, 250 feet in diameter, weighs 700 tons

electrical properties of the D region every hour or more frequently. Although these properties are believed to be due to radiation from the sun, winter observations at Halley Bay in the Antarctic show large variations in ionospheric properties that can only be explained by a regular pattern of strong winds.

One study which was added to the I.G.Y. programme at a late stage in the planning is the radioactivity of the air. Both short- and long-term changes of radioactivity depend to some extent on nuclear-bomb explosions and this world-wide study will help to determine how rapidly the air in the vicinity of an explosion mixes in with the rest of the atmosphere. One small-scale result of the network of I.G.Y. reporting stations in Europe came to light after the accident at the Windscale nuclear reactor in October 1957. It was possible to plot the path of radioactivity from the accident over a few hundred miles and the presence of unsuspected meteorological features was shown by the way in which the cloud dispersed.

As I explained at the beginning of this article, it is impossible to fit the whole jigsaw-

puzzle of the related I.G.Y. observations together at the present time. In fact we are not sure whether some of the investigations should fit into the jigsaw or not. For example it has been suggested many times that the sunspot cycle affects the weather at the surface of the earth, and although some connection seems likely the evidence is scarce. Furthermore, the physical processes involved are far from being explained. Will the I.G.Y. observations confirm and explain the link? The answer will not be known until much more time and study have been given to this question. It is nevertheless clear already that the I.G.Y. observations will answer most of the problems they were intended to solve; and if here and there they do not provide the answers, the geophysicists can justly claim that results which were not anticipated more than make up for any shortcomings elsewhere. However, as with all knowledge, the answering of such questions is likely to raise a greater number of new ones as man's mind gradually begins to understand the nature of the space through which our planet and sun are moving.